

0050102

170190-1/12  
**Thermo NUTech**

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October 12, 1998

Ms. Doris Ayres  
Bechtel Hanford Inc.  
3350 George Washington Way  
Richland, WA 99352

Reference: P.O. #TRB-SBB-207925  
Thermo Nutech N808085-7492, SDG H0198

Dear Ms. Ayres:

Enclosed is an amended data report for three liquid samples designated under SAF No. B98-060 received at Thermo Nutech on August 18, 1998. The gamma spectroscopy add-on nuclides Sb-125, Cs-134, Ra-226, and Ra-228 have been included.

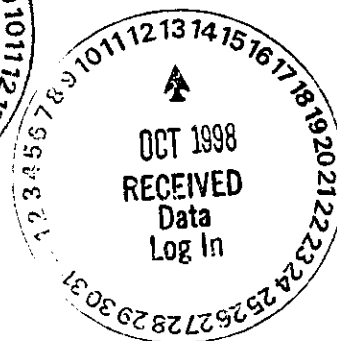
Sincerely,



N. Joseph Verville  
Program Manager

/jv

Enclosure: Data Package



**TMA/RICHMOND**  
SAMPLE DELIVERY GROUP H0198

**SAMPLE SUMMARY**

SDG 7492  
Contact N. Joseph Verville

Client Hanford  
Contract TRB-SBB-207925  
Case no SDG H0198

| CLIENT SAMPLE ID       | LOCATION | MATRIX | LEVEL | LAB<br>SAMPLE ID | SAF NO  | CHAIN OF<br>CUSTODY | COLLECTED      |
|------------------------|----------|--------|-------|------------------|---------|---------------------|----------------|
| B0PPC1                 | 200 West | LIQUID |       | N808085-01       | B98-060 | B98-060-09          | 08/10/98 15:00 |
| B0PPC2                 | 200 West | LIQUID |       | N808085-02       | B98-060 | B98-060-09          | 08/10/98 15:05 |
| B0PPC3                 | 200 West | LIQUID |       | N808085-03       | B98-060 | B98-060-09          | 08/10/98 15:20 |
| Method Blank           |          | LIQUID |       | N808085-05       | B98-060 |                     |                |
| Lab Control Sample     |          | LIQUID |       | N808085-04       | B98-060 |                     |                |
| Duplicate (N808085-01) | 200 West | LIQUID |       | N808085-06       | B98-060 |                     | 08/10/98 15:00 |
| Duplicate (N808085-02) | 200 West | LIQUID |       | N808085-07       | B98-060 |                     | 08/10/98 15:05 |

SAMPLE SUMMARY

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Lab id TMANC  
Protocol Hanford  
Version Ver 1.0  
Form DVD-CS  
Version 3.06  
Report date 10/12/98

## TMA/RICHMOND

SAMPLE DELIVERY GROUP H0198

SDG 7492

Contact N. Joseph Verville

## QC SUMMARY

Client HanfordContract TRB-SBB-207925Case no SDG H0198

| QC BATCH | CHAIN OF CUSTODY | CLIENT SAMPLE ID       | MATRIX | % SOLIDS | SAMPLE AMOUNT | BASIS AMOUNT | DAYS SINCE RECEIVED | LAB COLL SAMPLE ID | DEPARTMENT SAMPLE ID |
|----------|------------------|------------------------|--------|----------|---------------|--------------|---------------------|--------------------|----------------------|
| 7492     | B98-060-09       | B0PPC1                 | LIQUID |          |               |              | 08/18/98            | B N808085-01       | 7492-001             |
|          |                  | B0PPC2                 | LIQUID |          |               |              | 08/18/98            | C N808085-02       | 7492-002             |
|          |                  | B0PPC3                 | LIQUID |          |               |              | 08/18/98            | D N808085-03       | 7492-003             |
|          |                  | Method Blank           | LIQUID |          |               |              |                     | N808085-05         | 7492-005             |
|          |                  | Lab Control Sample     | LIQUID |          |               |              |                     | N808085-04         | 7492-004             |
|          |                  | Duplicate (N808085-01) | LIQUID |          |               |              | 08/18/98            | E N808085-06       | 7492-006             |
|          |                  | Duplicate (N808085-02) | LIQUID |          |               |              | 08/18/98            | F N808085-07       | 7492-007             |

QC SUMMARY

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Lab id TMANCProtocol HanfordVersion Ver 1.0Form DVD-QSVersion 3.06Report date 10/12/98

## TMA/RICHMOND

SAMPLE DELIVERY GROUP H0198

SDG 7492

Contact N. Joseph Verville

## PREP BATCH SUMMARY

Client HanfordContract TRB-SBB-207925Case no SDG H0198

| TEST                      | MATRIX | METHOD                         | PREPARATION ERROR |      | PLANCHETS ANALYZED |      |    |       |     | QUALI- |          |
|---------------------------|--------|--------------------------------|-------------------|------|--------------------|------|----|-------|-----|--------|----------|
|                           |        |                                | BATCH             | 2σ % | CLIENT             | MORE | RE | BLANK | LCS |        | DUP/ORIG |
| Alpha Spectroscopy        |        |                                |                   |      |                    |      |    |       |     |        |          |
| NP                        | LIQUID | Neptunium in liquids           | 2785-118          | 5.0  | 3                  |      |    | 1     | 1   | 1/1    |          |
| PU                        | LIQUID | Plutonium-238,239/240, Liquid  | 2785-118          | 5.0  | 3                  |      |    | 1     | 1   | 1/1    |          |
| TP                        | LIQUID | Americium 241/Curium in Liquid | 2785-118          | 5.0  | 3                  |      |    | 1     | 1   | 1/1    |          |
| Beta Counting             |        |                                |                   |      |                    |      |    |       |     |        |          |
| SR                        | LIQUID | Total Strontium in Liquids     | 2785-118          | 10.0 | 3                  |      |    | 1     | 1   | 1/1    |          |
| Gas Proportional Counting |        |                                |                   |      |                    |      |    |       |     |        |          |
| 90A                       | LIQUID | Gross Alpha in Liquid Samples  | 2785-118          | 20.0 | 3                  |      |    | 1     | 1   | 1/1    |          |
| 90B                       | LIQUID | Gross Beta in Liquid Samples   | 2785-118          | 15.0 | 3                  |      |    | 1     | 1   | 1/1    |          |
| Gamma Spectroscopy        |        |                                |                   |      |                    |      |    |       |     |        |          |
| GAM                       | LIQUID | Gamma Scan in Liquid           | 2785-118          | 10.0 | 3                  |      |    | 1     | 1   | 1/1    |          |

Duplicates and Matrix Spikes are those with original (Client) sample in this Sample Delivery Group.

Blank and LCS planchets are those in the same preparation batch as some Client, Duplicate or Spike sample.

PREP BATCH SUMMARY

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Lab id TMANCProtocol HanfordVersion Ver 1.0Form DVD-PBSVersion 3.06Report date 10/12/98

## TMA/RICHMOND

SAMPLE DELIVERY GROUP H0198

SDG 7492

Contact N. Joseph Verville

## WORK SUMMARY

Client HanfordContract TRB-SBB-207925Case no SDG H0198

| CLIENT SAMPLE ID   |         | LAB SAMPLE ID |          |        |      |          |          |     |                                |  |  |
|--------------------|---------|---------------|----------|--------|------|----------|----------|-----|--------------------------------|--|--|
| LOCATION           | MATRIX  | COLLECTED     | PLANCHET | TEST   | SUF- | ANALYZED | REVIEWED | BY  | METHOD                         |  |  |
| CUSTODY            | SAF No  | RECEIVED      |          |        | FIX  |          |          |     |                                |  |  |
| B0PPC1             |         | N808085-01    | 7492-001 | 80A/80 |      | 08/25/98 | 09/09/98 | NJV | Gross Alpha in Liquid Samples  |  |  |
| 200 West           | LIQUID  | 08/10/98      | 7492-001 | 80B/80 |      | 08/25/98 | 09/09/98 | NJV | Gross Beta in Liquid Samples   |  |  |
| B98-060-09         | B98-060 | 08/18/98      | 7492-001 | GAM    |      | 08/25/98 | 09/09/98 | NJV | Gamma Scan in Liquid           |  |  |
|                    |         |               | 7492-001 | NP     |      | 09/07/98 | 09/09/98 | NJV | Neptunium in liquids           |  |  |
|                    |         |               | 7492-001 | PU     |      | 08/27/98 | 09/09/98 | NJV | Plutonium-238,239/240, Liquid  |  |  |
|                    |         |               | 7492-001 | SR     |      | 08/27/98 | 09/09/98 | NJV | Total Strontium in Liquids     |  |  |
|                    |         |               | 7492-001 | TP     |      | 09/02/98 | 09/09/98 | NJV | Americium 241/Curium in Liquid |  |  |
| B0PPC2             |         | N808085-02    | 7492-002 | 80A/80 |      | 08/25/98 | 09/09/98 | NJV | Gross Alpha in Liquid Samples  |  |  |
| 200 West           | LIQUID  | 08/10/98      | 7492-002 | 80B/80 |      | 08/25/98 | 09/09/98 | NJV | Gross Beta in Liquid Samples   |  |  |
| B98-060-09         | B98-060 | 08/18/98      | 7492-002 | GAM    |      | 08/25/98 | 09/09/98 | NJV | Gamma Scan in Liquid           |  |  |
|                    |         |               | 7492-002 | NP     |      | 09/07/98 | 09/09/98 | NJV | Neptunium in liquids           |  |  |
|                    |         |               | 7492-002 | PU     |      | 08/27/98 | 09/09/98 | NJV | Plutonium-238,239/240, Liquid  |  |  |
|                    |         |               | 7492-002 | SR     |      | 08/27/98 | 09/09/98 | NJV | Total Strontium in Liquids     |  |  |
|                    |         |               | 7492-002 | TP     |      | 09/02/98 | 09/09/98 | NJV | Americium 241/Curium in Liquid |  |  |
| B0PPC3             |         | N808085-03    | 7492-003 | 80A/80 |      | 08/25/98 | 09/09/98 | NJV | Gross Alpha in Liquid Samples  |  |  |
| 200 West           | LIQUID  | 08/10/98      | 7492-003 | 80B/80 |      | 08/25/98 | 09/09/98 | NJV | Gross Beta in Liquid Samples   |  |  |
| B98-060-09         | B98-060 | 08/18/98      | 7492-003 | GAM    |      | 08/25/98 | 09/09/98 | NJV | Gamma Scan in Liquid           |  |  |
|                    |         |               | 7492-003 | NP     |      | 09/07/98 | 09/09/98 | NJV | Neptunium in liquids           |  |  |
|                    |         |               | 7492-003 | PU     |      | 08/27/98 | 09/09/98 | NJV | Plutonium-238,239/240, Liquid  |  |  |
|                    |         |               | 7492-003 | SR     |      | 08/27/98 | 09/09/98 | NJV | Total Strontium in Liquids     |  |  |
|                    |         |               | 7492-003 | TP     |      | 09/02/98 | 09/09/98 | NJV | Americium 241/Curium in Liquid |  |  |
| Method Blank       |         | N808085-05    | 7492-005 | 80A/80 |      | 08/25/98 | 09/09/98 | NJV | Gross Alpha in Liquid Samples  |  |  |
|                    | LIQUID  |               | 7492-005 | 80B/80 |      | 08/25/98 | 09/09/98 | NJV | Gross Beta in Liquid Samples   |  |  |
|                    | B98-060 |               | 7492-005 | GAM    |      | 08/27/98 | 09/09/98 | NJV | Gamma Scan in Liquid           |  |  |
|                    |         |               | 7492-005 | NP     |      | 09/07/98 | 09/09/98 | NJV | Neptunium in liquids           |  |  |
|                    |         |               | 7492-005 | PU     |      | 08/27/98 | 09/09/98 | NJV | Plutonium-238,239/240, Liquid  |  |  |
|                    |         |               | 7492-005 | SR     |      | 08/27/98 | 09/09/98 | NJV | Total Strontium in Liquids     |  |  |
|                    |         |               | 7492-005 | TP     |      | 09/02/98 | 09/09/98 | NJV | Americium 241/Curium in Liquid |  |  |
| Lab Control Sample |         | N808085-04    | 7492-004 | 80A/80 |      | 08/25/98 | 09/09/98 | NJV | Gross Alpha in Liquid Samples  |  |  |
|                    | LIQUID  |               | 7492-004 | 80B/80 |      | 08/25/98 | 09/09/98 | NJV | Gross Beta in Liquid Samples   |  |  |
|                    | B98-060 |               | 7492-004 | GAM    |      | 08/27/98 | 09/09/98 | NJV | Gamma Scan in Liquid           |  |  |
|                    |         |               | 7492-004 | NP     |      | 09/07/98 | 09/09/98 | NJV | Neptunium in liquids           |  |  |
|                    |         |               | 7492-004 | PU     |      | 08/27/98 | 09/09/98 | NJV | Plutonium-238,239/240, Liquid  |  |  |
|                    |         |               | 7492-004 | SR     |      | 08/27/98 | 09/09/98 | NJV | Total Strontium in Liquids     |  |  |
|                    |         |               | 7492-004 | TP     |      | 09/02/98 | 09/09/98 | NJV | Americium 241/Curium in Liquid |  |  |

## WORK SUMMARY

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## SUMMARY DATA SECTION

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Lab id TMANCProtocol HanfordVersion Ver 1.0Form DVD-CWSVersion 3.06Report Date 10/12/98

# TMA/RICHMOND

SAMPLE DELIVERY GROUP H0198

SDG 7492

Contact N. Joseph Verville

## WORK SUMMARY, cont.

Client Hanford

Contract TRB-SBB-207925

Case no SDG H0198

| CLIENT SAMPLE ID       |         | LAB SAMPLE ID |          |        |      |          |          |     |                                |  |  |
|------------------------|---------|---------------|----------|--------|------|----------|----------|-----|--------------------------------|--|--|
| LOCATION               | MATRIX  | COLLECTED     |          | TEST   | SUF- |          |          |     |                                |  |  |
| CUSTODY                | SAF No  | RECEIVED      | PLANCHET | TEST   | FIX  | ANALYZED | REVIEWED | BY  | METHOD                         |  |  |
| Duplicate (N808085-01) |         | N808085-06    | 7492-006 | GAM    |      | 08/27/98 | 09/09/98 | NJV | Gamma Scan in Liquid           |  |  |
| 200 West               | LIQUID  | 08/10/98      | 7492-006 | PU     |      | 08/27/98 | 09/09/98 | NJV | Plutonium-238,239/240, Liquid  |  |  |
|                        | B98-060 | 08/18/98      | 7492-006 | SR     |      | 08/27/98 | 09/09/98 | NJV | Total Strontium in Liquids     |  |  |
|                        |         |               | 7492-006 | TP     |      | 09/02/98 | 09/09/98 | NJV | Americium 241/Curium in Liquid |  |  |
| Duplicate (N808085-02) |         | N808085-07    | 7492-007 | 80A/80 |      | 08/26/98 | 09/09/98 | NJV | Gross Alpha in Liquid Samples  |  |  |
| 200 West               | LIQUID  | 08/10/98      | 7492-007 | 80B/80 |      | 08/26/98 | 09/09/98 | NJV | Gross Beta in Liquid Samples   |  |  |
|                        | B98-060 | 08/18/98      | 7492-007 | NP     |      | 09/07/98 | 09/09/98 | NJV | Neptunium in liquids           |  |  |

## COUNTS OF TESTS BY SAMPLE TYPE

| TEST   | SAF No  | METHOD                         | REFERENCE  | CLIENT | MORE | RE | BLANK | LCS | DUP SPIKE | TOTAL |
|--------|---------|--------------------------------|------------|--------|------|----|-------|-----|-----------|-------|
| 80A/80 | B98-060 | Gross Alpha in Liquid Samples  | EPA900.0   | 3      |      |    | 1     | 1   | 1         | 6     |
| 80B/80 | B98-060 | Gross Beta in Liquid Samples   | EPA900.0   | 3      |      |    | 1     | 1   | 1         | 6     |
| GAM    | B98-060 | Gamma Scan in Liquid           | GAMMAHI    | 3      |      |    | 1     | 1   | 1         | 6     |
| NP     | B98-060 | Neptunium in liquids           | NP237PLATE | 3      |      |    | 1     | 1   | 1         | 6     |
| PU     | B98-060 | Plutonium-238,239/240, Liquid  | FUPLATE    | 3      |      |    | 1     | 1   | 1         | 6     |
| SR     | B98-060 | Total Strontium in Liquids     | SR98/90    | 3      |      |    | 1     | 1   | 1         | 6     |
| TP     | B98-060 | Americium 241/Curium in Liquid |            | 3      |      |    | 1     | 1   | 1         | 6     |
| TOTALS |         |                                |            | 21     |      |    | 7     | 7   | 7         | 42    |

WORK SUMMARY

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Lab id TMANC

Protocol Hanford

Version Ver 1.0

Form DVD-CWS

Version 3.06

Report date 10/12/98

**TMA / RICHMOND**  
**SAMPLE DELIVERY GROUP H0198**

**N808085-05**

**Method Blank**

**METHOD BLANK**

|                                   |                                      |                  |
|-----------------------------------|--------------------------------------|------------------|
| SDG <u>7492</u>                   | Client/Case no <u>Hanford</u>        | SDG <u>H0198</u> |
| Contact <u>N. Joseph Verville</u> | Case no <u>TRB-SBB-207925</u>        |                  |
| Lab sample id <u>N808085-05</u>   | Client sample id <u>Method Blank</u> |                  |
| Dept sample id <u>7492-005</u>    | Material/Matrix <u>LIQUID</u>        |                  |
|                                   | SAF No <u>B98-060</u>                |                  |

| ANALYTE             | CAS NO     | RESULT<br>pCi/L | 2σ ERR<br>(COUNT) | MDA<br>pCi/L | RDL<br>pCi/L | QUALI-<br>FIERS | TEST |
|---------------------|------------|-----------------|-------------------|--------------|--------------|-----------------|------|
| Gross Alpha         | 12587-46-1 | -0.21           | 1.2               | 2.9          | 3.0          | U               | 80A  |
| Gross Beta          | 12587-47-2 | -1.9            | 3.4               | 6.2          | 4.0          | U               | 80B  |
| Curium 244          | 13981-15-2 | 0               | 0.056             | 0.14         |              | U               | TP   |
| Plutonium 238       | 13981-16-3 | 0.090           | 0.078             | 0.099        | 1.0          | U               | PU   |
| Plutonium 239/240   | 15117-48-3 | 0.13            | 0.078             | 0.099        | 1.0          | J               | PU   |
| Americium 241       | 14596-10-2 | 0.028           | 0.085             | 0.11         |              | U               | TP   |
| Strontium 90        | SR-90      | -0.64           | 1.8               | 2.3          | 2.0          | U               | SR   |
| Neptunium 237       | NP237PLATE | 0.077           | 0.077             | 0.15         |              | U               | NP   |
| GAMMA SCAN ANALYTES |            | U               |                   |              |              |                 |      |
| Potassium 40        | 13966-00-2 | U               |                   | 220          |              | U               | GAM  |
| Cobalt 60           | 10198-40-0 | U               |                   | 15           | 25           | U               | GAM  |
| Antimony 125        | 14234-35-6 | U               |                   | 31           |              | U               | GAM  |
| Cesium 134          | 13967-70-9 | U               |                   | 15           |              | U               | GAM  |
| Cesium 137          | 10045-97-3 | U               |                   | 13           | 15           | U               | GAM  |
| Europium 152        | 14683-23-9 | U               |                   | 36           | 50           | U               | GAM  |
| Europium 154        | 15585-10-1 | U               |                   | 40           | 50           | U               | GAM  |
| Europium 155        | 14391-16-3 | U               |                   | 33           | 50           | U               | GAM  |
| Radium 228          | 15262-20-1 | U               |                   | 59           |              | U               | GAM  |
| Americium 241       | 14596-10-2 | U               |                   | 41           |              | U               | GAM  |

202-S Bldg-Pu Loadout Hood-Other Liq

QC-BLANK 28921

## TMA/RICHMOND

SAMPLE DELIVERY GROUP H0198

N808085-04

Lab Control Sample

## LAB CONTROL SAMPLE

SDG 7492

Client/Case no Hanford

SDG H0198

Contact N. Joseph Verville

Case no TRB-SBB-207925

Lab sample id N808085-04

Client sample id Lab Control Sample

Dept sample id 7492-004

Material/Matrix LIQUID

SAF No B98-060

| ANALYTE               | RESULT<br>pCi/L | 2 $\sigma$ ERR<br>(COUNT) | MDA<br>pCi/L | RDL<br>pCi/L | QUALI-<br>FIERS | TEST | ADDED<br>pCi/L | 2 $\sigma$ ERR<br>pCi/L | REC<br>% | 3 $\sigma$ LMTS<br>(TOTAL) | PROTOCOL<br>LIMITS |
|-----------------------|-----------------|---------------------------|--------------|--------------|-----------------|------|----------------|-------------------------|----------|----------------------------|--------------------|
| Gross Alpha           | 190             | 7.3                       | 1.5          | 3.0          |                 | 80A  | 192            | 7.7                     | 99       | 69-131                     | 80-120             |
| Gross Beta            | 210             | 5.6                       | 3.8          | 4.0          |                 | 80B  | 224            | 9.0                     | 94       | 78-122                     | 80-120             |
| Curium 244            | 51              | 3.0                       | 0.10         |              |                 | TP   | 55.6           | 2.2                     | 92       | 88-112                     |                    |
| Plutonium 238         | 46              | 2.9                       | 0.099        | 1.0          |                 | PU   | 50.6           | 2.0                     | 91       | 87-113                     | 80-120             |
| Plutonium 239/240     | 49              | 3.1                       | 0.12         | 1.0          | B               | PU   | 53.0           | 2.1                     | 92       | 87-113                     | 80-120             |
| Americium 241         | 45              | 2.7                       | 0.13         |              |                 | TP   | 48.0           | 1.9                     | 94       | 87-113                     |                    |
| Strontium 90          | 110             | 5.2                       | 2.6          | 2.0          |                 | SR   | 108            | 4.3                     | 102      | 81-119                     |                    |
| Neptunium 237         | 52              | 2.0                       | 0.099        |              |                 | NP   | 52.9           | 2.1                     | 98       | 89-111                     |                    |
| GAMMA SCAN ANALYTES U |                 |                           |              |              |                 |      |                |                         |          |                            |                    |
| Cobalt 60             | 540             | 44                        | 22           | 25           |                 | GAM  | 498            | 20                      | 108      | 78-122                     | 80-120             |
| Cesium 137            | 660             | 41                        | 29           | 15           |                 | GAM  | 582            | 23                      | 113      | 79-121                     | 80-120             |

202-S Bldg-Pu Loadout Hood-Other Liq

QC-LCS 28920

LAB CONTROL SAMPLES

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Lab id TMANC

Protocol Hanford

Version Ver 1.0

Form DVD-LCS

Version 3.06

Report date 10/12/98

## TMA/RICHMOND

SAMPLE DELIVERY GROUP H0198

N808085-06

B0PPC1

## DUPLICATE

SDG 7492

Contact N. Joseph Verville

DUPLICATE

Lab sample id N808085-06Dept sample id 7492-006

ORIGINAL

Lab sample id N808085-01Dept sample id 7492-001Received 08/18/98Client/Case no Hanford SDG H0198Case no TRB-SBB-207925Client sample id B0PPC1Location/Matrix 200 West LIQUIDCollected 08/10/98 15:00Custody/SAF No B98-060-03 B98-060

| ANALYTE             | DUPLICATE<br>pCi/L | 2σ ERR<br>(COUNT) | MDA<br>pCi/L | RDL<br>pCi/L | QUALI-<br>FIERS | TEST | ORIGINAL<br>pCi/L | 2σ ERR<br>(COUNT) | MDA<br>pCi/L | QUALI-<br>FIERS | RPD<br>% | 3σ<br>TOT | PROT<br>LIMIT |
|---------------------|--------------------|-------------------|--------------|--------------|-----------------|------|-------------------|-------------------|--------------|-----------------|----------|-----------|---------------|
| Curium 244          | 0.21               | 0.12              | 0.12         |              |                 | TP   | 0                 | 0.080             | 0.15         | U               | 200      | 207       |               |
| Plutonium 238       | 0                  | 0.025             | 0.095        | 1.0          | U               | PU   | 0.14              | 0.14              | 0.25         | U               | -        |           |               |
| Plutonium 239/240   | -0.025             | 0.025             | 0.12         | 1.0          | U               | PU   | 0                 | 0.11              | 0.22         | U               | -        |           |               |
| Americium 241       | 0.20               | 0.12              | 0.12         |              |                 | TP   | 0.027             | 0.080             | 0.10         | U               | 152      | 191       |               |
| Strontium 90        | 0.095              | 1.8               | <u>2.2</u>   | 2.0          | U               | SR   | 0.58              | 1.8               | <u>2.2</u>   | U               | -        |           |               |
| GAMMA SCAN ANALYTES | U                  |                   |              |              |                 |      | U                 |                   |              |                 |          |           |               |
| Potassium 40        | U                  |                   | 81           |              | U               | GAM  | U                 |                   | 180          | U               | -        |           |               |
| Cobalt 60           | U                  |                   | 5.9          | 25           | U               | GAM  | U                 |                   | 19           | U               | -        |           |               |
| Antimony 125        | U                  |                   | 14           |              | U               | GAM  | U                 |                   | 35           | U               | -        |           |               |
| Cesium 134          | U                  |                   | 7.4          |              | U               | GAM  | U                 |                   | 22           | U               | -        |           |               |
| Cesium 137          | U                  |                   | 5.5          | 15           | U               | GAM  | U                 |                   | <u>16</u>    | U               | -        |           |               |
| Europium 152        | U                  |                   | 16           | 50           | U               | GAM  | U                 |                   | 45           | U               | -        |           |               |
| Europium 154        | U                  |                   | 21           | 50           | U               | GAM  | U                 |                   | <u>56</u>    | U               | -        |           |               |
| Europium 155        | U                  |                   | 15           | 50           | U               | GAM  | U                 |                   | 27           | U               | -        |           |               |
| Radium 226          | U                  |                   | 11           |              | U               | GAM  | U                 |                   | 28           | U               | -        |           |               |
| Radium 228          | U                  |                   | 27           |              | U               | GAM  | U                 |                   | 81           | U               | -        |           |               |
| Americium 241       | U                  |                   | 16           |              | U               | GAM  | U                 |                   | 17           | U               | -        |           |               |

202-S Bldg-Pu Loadout Hood-Other Liq

QC-DUP#1 28922

## DUPLICATES

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## SUMMARY DATA SECTION

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Lab id TMANCProtocol HanfordVersion Ver 1.0Form DVD-DUPVersion 3.06Report date 10/22/98

## TMA/RICHMOND

SAMPLE DELIVERY GROUP H0198

N808085-07

B0PPC2

## DUPLICATE

SDG 7492Contact N. Joseph Verville

DUPLICATE

Lab sample id N808085-07Dept sample id 7492-007

ORIGINAL

Lab sample id N808085-02Dept sample id 7492-002Received 08/18/98Client/Case no Hanford SDG H0198Case no TRB-SBB-207925Client sample id B0PPC2Location/Matrix 200 West LIQUIDCollected 08/10/98 15:05Custody/SAP No B98-060-09 B98-060

| ANALYTE       | DUPLICATE<br>pCi/L | 2 $\sigma$ ERR<br>(COUNT) | MDA<br>pCi/L | RDL<br>pCi/L | QUALI-<br>FIERS | TEST | ORIGINAL<br>pCi/L | 2 $\sigma$ ERR<br>(COUNT) | MDA<br>pCi/L | QUALI-<br>FIERS | RPD<br>% | 3 $\sigma$ PROT<br>TOT LIMIT |
|---------------|--------------------|---------------------------|--------------|--------------|-----------------|------|-------------------|---------------------------|--------------|-----------------|----------|------------------------------|
| Gross Alpha   | -0.31              | 0.97                      | 2.4          | 3.0          | U               | 80A  | 0.41              | 1.2                       | 2.2          | U               | -        |                              |
| Gross Beta    | -2.6               | 3.6                       | 6.4          | 4.0          | U               | 80B  | -0.071            | 3.3                       | 5.6          | U               | -        |                              |
| Neptunium 237 | 0                  | 0.044                     | 0.11         |              | U               | NP   | 0.040             | 0.081                     | 0.14         | U               | -        |                              |

202-S Bldg-Pu Loadout Hood-Other Liq

QC-DUP#2 28990

DUPLICATES

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SUMMARY DATA SECTION

Page 11

Lab id TMANCProtocol HanfordVersion Ver 1.0Form DVD-DUPVersion 3.06Report date 10/12/98

**TMA / RICHMOND**  
**SAMPLE DELIVERY GROUP H0198**

**N808085-01**

**B0PPC1**

**DATA SHEET**

SDG 7492 Client/Case no Hanford SDG H0198  
 Contact N. Joseph Verville Case no TRB-SBB-207925

Lab sample id N808085-01 Client sample id B0PPC1  
 Dept sample id 7492-001 Location/Matrix 200 West LIQUID  
 Received 08/18/98 Collected 08/10/98 15:00  
 Custody/SAF No B98-060-09 B98-060

| ANALYTE             | CAS NO     | RESULT<br>pCi/L | 2σ ERR<br>(COUNT) | MDA<br>pCi/L | RDL<br>pCi/L | QUALI-<br>FIERS | TEST |
|---------------------|------------|-----------------|-------------------|--------------|--------------|-----------------|------|
| Gross Alpha         | 12587-46-1 | -0.30           | 0.53              | 1.1          | 3.0          | U               | 80A  |
| Gross Beta          | 12587-47-2 | -1.0            | 1.7               | 2.8          | 4.0          | U               | 80B  |
| Curium 244          | 13981-15-2 | 0               | 0.080             | 0.15         |              | U               | TP   |
| Plutonium 238       | 13981-16-3 | 0.14            | 0.14              | 0.25         | 1.0          | U               | PU   |
| Plutonium 239/240   | 15117-48-3 | 0               | 0.11              | 0.22         | 1.0          | U               | PU   |
| Americium 241       | 14596-10-2 | 0.027           | 0.080             | 0.10         |              | U               | TP   |
| Strontium 90        | SR-90      | 0.58            | 1.8               | 2.2          | 2.0          | U               | SR   |
| Neptunium 237       | NP237PLATE | -0.012          | 0.069             | 0.17         |              | U               | NP   |
| GAMMA SCAN ANALYTES |            | U               |                   |              |              |                 |      |
| Potassium 40        | 13966-00-2 | U               |                   | 180          |              | U               | GAM  |
| Cobalt 60           | 10198-40-0 | U               |                   | 19           | 25           | U               | GAM  |
| Antimony 125        | 14234-35-6 | U               |                   | 35           |              | U               | GAM  |
| Cesium 134          | 13967-70-9 | U               |                   | 22           |              | U               | GAM  |
| Cesium 137          | 10045-97-3 | U               |                   | 16           | 15           | U               | GAM  |
| Europium 152        | 14683-23-9 | U               |                   | 45           | 50           | U               | GAM  |
| Europium 154        | 15585-10-1 | U               |                   | 56           | 50           | U               | GAM  |
| Europium 155        | 14391-16-3 | U               |                   | 27           | 50           | U               | GAM  |
| Radium 226          | 13982-63-3 | U               |                   | 28           |              | U               | GAM  |
| Radium 228          | 15262-20-1 | U               |                   | 81           |              | U               | GAM  |
| Americium 241       | 14596-10-2 | U               |                   | 17           |              | U               | GAM  |

202-S Bldg-Pu Loadout Hood-Other Liq

**DATA SHEETS**

Page 1

**SUMMARY DATA SECTION**

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Lab id TMANC  
 Protocol Hanford  
 Version Ver 1.0  
 Form DVD-DS  
 Version 3.06  
 Report date 10/12/98

**TMA / RICHMOND**  
**SAMPLE DELIVERY GROUP H0198**

**N808085-02**

**B0PPC2**

**DATA SHEET**

|                                   |                                  |                  |
|-----------------------------------|----------------------------------|------------------|
| SDG <u>7492</u>                   | Client/Case no <u>Hanford</u>    | SDG <u>H0198</u> |
| Contact <u>N. Joseph Verville</u> | Case no <u>TRB-SBB-207925</u>    |                  |
| Lab sample id <u>N808085-02</u>   | Client sample id <u>B0PPC2</u>   |                  |
| Dept sample id <u>7492-002</u>    | Location/Matrix <u>200 West</u>  | <u>LIQUID</u>    |
| Received <u>08/18/98</u>          | Collected <u>08/10/98 15:05</u>  |                  |
|                                   | Custody/SAF No <u>B98-060-09</u> | <u>B98-060</u>   |

| ANALYTE             | CAS NO     | RESULT<br>pCi/L | 2σ ERR<br>(COUNT) | MDA<br>pCi/L | RDL<br>pCi/L | QUALI-<br>FIERS | TEST |
|---------------------|------------|-----------------|-------------------|--------------|--------------|-----------------|------|
| Gross Alpha         | 12587-46-1 | 0.41            | 1.2               | 2.2          | 3.0          | U               | 80A  |
| Gross Beta          | 12587-47-2 | -0.071          | 3.3               | 5.6          | 4.0          | U               | 80B  |
| Curium 244          | 13981-15-2 | 0.10            | 0.089             | 0.11         |              | U               | TP   |
| Plutonium 238       | 13981-16-3 | 0.039           | 0.078             | 0.15         | 1.0          | U               | PU   |
| Plutonium 239/240   | 15117-48-3 | 0.020           | 0.078             | 0.15         | 1.0          | U               | PU   |
| Americium 241       | 14596-10-2 | 0.015           | 0.059             | 0.11         |              | U               | TP   |
| Strontium 90        | SR-90      | 0.20            | 1.6               | 2.0          | 2.0          | U               | SR   |
| Neptunium 237       | NP237PLATE | 0.040           | 0.081             | 0.14         |              | U               | NP   |
| GAMMA SCAN ANALYTES |            | U               |                   |              |              |                 |      |
| Potassium 40        | 13966-00-2 | U               |                   | 230          |              | U               | GAM  |
| Cobalt 60           | 10198-40-0 | U               |                   | 18           | 25           | U               | GAM  |
| Antimony 125        | 14234-35-6 | U               |                   | 34           |              | U               | GAM  |
| Cesium 134          | 13967-70-9 | U               |                   | 16           |              | U               | GAM  |
| Cesium 137          | 10045-97-3 | U               |                   | 16           | 15           | U               | GAM  |
| Europium 152        | 14683-23-9 | U               |                   | 38           | 50           | U               | GAM  |
| Europium 154        | 15585-10-1 | U               |                   | 54           | 50           | U               | GAM  |
| Europium 155        | 14391-16-3 | U               |                   | 36           | 50           | U               | GAM  |
| Radium 226          | 13982-63-3 | U               |                   | 23           |              | U               | GAM  |
| Radium 228          | 15262-20-1 | U               |                   | 60           |              | U               | GAM  |
| Americium 241       | 14596-10-2 | U               |                   | 45           |              | U               | GAM  |

202-S Bldg-Pu Loadout Hood-Other Liq

**TMA / RICHMOND**  
**SAMPLE DELIVERY GROUP H0198**

**N808085-03**

**B0PPC3**

**DATA SHEET**

|                                   |                                  |                  |
|-----------------------------------|----------------------------------|------------------|
| SDG <u>7492</u>                   | Client/Case no <u>Hanford</u>    | SDG <u>H0198</u> |
| Contact <u>N. Joseph Verville</u> | Case no <u>TRB-SBB-207925</u>    |                  |
| Lab sample id <u>N808085-03</u>   | Client sample id <u>B0PPC3</u>   |                  |
| Dept sample id <u>7492-003</u>    | Location/Matrix <u>200 West</u>  | <u>LIQUID</u>    |
| Received <u>08/18/98</u>          | Collected <u>08/10/98 15:20</u>  |                  |
|                                   | Custody/SAF No <u>B98-060-09</u> | <u>B98-060</u>   |

| ANALYTE             | CAS NO     | RESULT<br>pCi/L | 2σ ERR<br>(COUNT) | MDA<br>pCi/L | RDL<br>pCi/L | QUALI-<br>FIERS | TEST |
|---------------------|------------|-----------------|-------------------|--------------|--------------|-----------------|------|
| Gross Alpha         | 12587-46-1 | -0.44           | 0.64              | 1.3          | 3.0          | U               | 80A  |
| Gross Beta          | 12587-47-2 | -0.89           | 1.6               | 2.8          | 4.0          | U               | 80B  |
| Curium 244          | 13981-15-2 | 0.013           | 0.053             | 0.10         |              | U               | TP   |
| Plutonium 238       | 13981-16-3 | -0.013          | 0.077             | 0.16         | 1.0          | U               | PU   |
| Plutonium 239/240   | 15117-48-3 | -0.013          | 0.077             | 0.16         | 1.0          | U               | PU   |
| Americium 241       | 14596-10-2 | -0.013          | 0.052             | 0.10         |              | U               | TP   |
| Strontium 90        | SR-90      | -0.92           | 2.0               | <u>2.5</u>   | 2.0          | U               | SR   |
| Neptunium 237       | NP237PLATE | 0.058           | <u>0.077</u>      | 0.058        |              |                 | NP   |
| GAMMA SCAN ANALYTES |            | U               |                   |              |              |                 |      |
| Potassium 40        | 13966-00-2 | U               |                   | 170          |              | U               | GAM  |
| Cobalt 60           | 10198-40-0 | U               |                   | 7.6          | 25           | U               | GAM  |
| Antimony 125        | 14234-35-6 | U               |                   | 15           |              | U               | GAM  |
| Cesium 134          | 13967-70-9 | U               |                   | 7.9          |              | U               | GAM  |
| Cesium 137          | 10045-97-3 | U               |                   | 6.0          | 15           | U               | GAM  |
| Europium 152        | 14683-23-9 | U               |                   | 18           | 50           | U               | GAM  |
| Europium 154        | 15585-10-1 | U               |                   | 20           | 50           | U               | GAM  |
| Europium 155        | 14391-16-3 | U               |                   | 17           | 50           | U               | GAM  |
| Radium 226          | 13982-63-3 | U               |                   | 12           |              | U               | GAM  |
| Radium 228          | 15262-20-1 | U               |                   | 28           |              | U               | GAM  |
| Americium 241       | 14596-10-2 | U               |                   | 17           |              | U               | GAM  |

202-S Bldg-Pu Loadout Hood-Other Liq

## TMA/RICHMOND

SAMPLE DELIVERY GROUP H0198

Test NP Matrix LIQUID  
 SDG 7492  
 Contact N. Joseph Verville

## METHOD SUMMARY

NEPTUNIUM IN LIQUIDS  
 ALPHA SPECTROSCOPY

Client Hanford  
 Contract TRE-SBB-207925  
 Case no SDG H0198

## RESULTS

| CLIENT SAMPLE ID           | LAB<br>SAMPLE ID | RAW<br>TEST FIX | SUF-<br>PLANCHET | Neptunium<br>237 |
|----------------------------|------------------|-----------------|------------------|------------------|
| Preparation batch 2785-118 |                  |                 |                  |                  |
| B0PPC1                     | N808085-01       | 7492-001        |                  | U                |
| B0PPC2                     | N808085-02       | 7492-002        |                  | U                |
| B0PPC3                     | N808085-03       | 7492-003        |                  | 0.058            |
| BLK (QC ID=28921)          | N808085-05       | 7492-005        |                  | U                |
| LCS (QC ID=28920)          | N808085-04       | 7492-004        |                  | ok               |
| Duplicate (N808085-02)     | N808085-07       | 7492-007        |                  | - U              |

Nominal values and limits from method RDLs (pCi/L)  
 202-S Bldg-Pu Loadout Hood-Other Liq

## METHOD PERFORMANCE

| CLIENT SAMPLE ID  | LAB<br>SAMPLE ID | RAW<br>TEST FIX | SUF-<br>pCi/L | MDA<br>L | ALIQ<br>L | PREP<br>FAC | DILU-<br>TION | YIELD<br>% | EPF<br>% | COUNT<br>min | FWHM<br>keV | DRIFT<br>KeV | DAYS<br>HELD PREPARED | ANAL-<br>YZED | DETECTOR |
|---|------------------|-----------------|---------------|----------|-----------|-------------|---------------|------------|----------|--------------|-------------|--------------|-----------------------|---------------|----------|
| Preparation batch 2785-118 2σ prep error 5.0 % Reference Lab Notebook #2785 pg. 118 |                  |                 |               |          |           |             |               |            |          |              |             |              |                       |               |          |
| B0PPC1  | N808085-01       |                 | 0.17          | 0.100    |           |             |               | 58         |          | 1812         |             |              | 28 09/04/98 09/07     | SS-009        |          |
| B0PPC2  | N808085-02       |                 | 0.14          | 0.100    |           |             |               | 64         |          | 1812         |             |              | 28 09/04/98 09/07     | SS-010        |          |
| B0PPC3  | N808085-03       |                 | 0.058         | 0.100    |           |             |               | 35         |          | 1812         |             |              | 28 09/04/98 09/07     | SS-011        |          |
| BLK (QC ID=28921)   | N808085-05       |                 | 0.15          | 0.100    |           |             |               | 34         |          | 1812         |             |              | 09/04/98 09/07        | SS-013        |          |
| LCS (QC ID=28920)   | N808085-04       |                 | 0.099         | 0.100    |           |             |               | 51         |          | 1812         |             |              | 09/04/98 09/07        | SS-012        |          |
| Duplicate (N808085-02)  | N808085-07       |                 | 0.11          | 0.100    |           |             |               | 58         |          | 1812         |             |              | 28 09/04/98 09/07     | SS-014        |          |
| (QC ID=28922)   |                  |                 |               |          |           |             |               |            |          |              |             |              |                       |               |          |

Nominal values and limits from method 0.100 20-105 100

PROCEDURES REFERENCE NP237PLATE  
 EP-930 Neptunium Purification, rev 0

AVERAGES ± 2 SD MDA 0.12 ± 0.081  
 FOR 6 SAMPLES YIELD 50 ± 25

## METHOD SUMMARIES

Page 1

## SUMMARY DATA SECTION

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Lab id TMANC  
 Protocol Hanford  
 Version Ver 1.0  
 Form DVD-CMS  
 Version 3.06  
 Report date 10/12/98

## TMA/RICHMOND

SAMPLE DELIVERY GROUP H0198

Test PU Matrix LIQUID

SDG 7492

Contact N. Joseph Verville

## METHOD SUMMARY

PLUTONIUM-238,239/240, LIQUID

ALPHA SPECTROSCOPY

Client Hanford

Contract TRB-SBB-207925

Case no SDG H0198

## RESULTS

| CLIENT SAMPLE ID           | LAB<br>SAMPLE ID | RAW<br>TEST FIX | SUF-<br>PLANCHET | Plutonium<br>238 | Plutonium<br>239/240 |
|----------------------------|------------------|-----------------|------------------|------------------|----------------------|
| Preparation batch 2785-118 |                  |                 |                  |                  |                      |
| B0PPC1                     | N808085-01       |                 | 7492-001         | U                | U                    |
| B0PPC2                     | N808085-02       |                 | 7492-002         | U                | U                    |
| B0PPC3                     | N808085-03       |                 | 7492-003         | U                | U                    |
| BLK (QC ID=28921)          | N808085-05       |                 | 7492-005         | U                | 0.13 J               |
| LCS (QC ID=28920)          | N808085-04       |                 | 7492-004         | ok               | ok                   |
| Duplicate (N808085-01)     | N808085-06       |                 | 7492-006         | - U              | - U                  |

Nominal values and limits from method RDLs (pCi/L) 1.0 1.0  
 202-S Bldg-Pu Loadout Hood-Other Liq

## METHOD PERFORMANCE

| CLIENT SAMPLE ID  | LAB<br>SAMPLE ID | RAW<br>TEST FIX | SUF-<br>pCi/L | MAX MDA<br>L | ALIQ<br>L | PREP<br>FAC | DILU-<br>TION | YIELD<br>% | EFF<br>% | COUNT<br>min | FWHM<br>keV | DRIFT<br>KeV | DAYS<br>HELD | ANAL-<br>PREPARED | YZED   | DETECTOR |
|---|------------------|-----------------|---------------|--------------|-----------|-------------|---------------|------------|----------|--------------|-------------|--------------|--------------|-------------------|--------|----------|
| Preparation batch 2785-118 2σ prep error 5.0 % Reference Lab Notebook #2785 pg. 118 |                  |                 |               |              |           |             |               |            |          |              |             |              |              |                   |        |          |
| B0PPC1  | N808085-01       |                 | 0.25          | 0.100        |           |             |               | 62         | 1086     |              |             |              | 17           | 08/27/98          | 08/27  | SS-009   |
| B0PPC2  | N808085-02       |                 | 0.15          | 0.100        |           |             |               | 54         | 1086     |              |             |              | 17           | 08/27/98          | 08/27  | SS-010   |
| B0PPC3  | N808085-03       |                 | 0.16          | 0.100        |           |             |               | 86         | 1086     |              |             |              | 17           | 08/27/98          | 08/27  | SS-011   |
| BLK (QC ID=28921)   | N808085-05       |                 | 0.099         | 0.100        |           |             |               | 85         | 1086     |              |             |              | 08/27/98     | 08/27             | SS-015 |          |
| LCS (QC ID=28920)   | N808085-04       |                 | 0.12          | 0.100        |           |             |               | 83         | 1086     |              |             |              | 08/27/98     | 08/27             | SS-012 |          |
| Duplicate (N808085-01)  | N808085-06       |                 | 0.12          | 0.100        |           |             |               | 88         | 1086     |              |             |              | 17           | 08/27/98          | 08/27  | SS-016   |
| (QC ID=28922)   |                  |                 |               |              |           |             |               |            |          |              |             |              |              |                   |        |          |

Nominal values and limits from method 1.0 1.00 700 180

PROCEDURES REFERENCE PUPLATE  
 RP-070 Sample Dissolution - HF Method, rev 0  
 RP-941 Plutonium Purification - Small Aliquot, rev 0

AVERAGES ± 2 SD MDA 0.15 ± 0.11  
 FOR 6 SAMPLES YIELD 76 ± 29

## METHOD SUMMARIES

Page 2

## SUMMARY DATA SECTION

Page 16

Lab id TMANC

Protocol Hanford

Version Ver 1.0

Form DVD-CMS

Version 3.06

Report date 10/12/98

## TMA/RICHMOND

SAMPLE DELIVERY GROUP H0198

Test TP Matrix LIQUID

SDG 7492

Contact N. Joseph Verville

## METHOD SUMMARY

AMERICIUM 241/CURIUM IN LIQUID

ALPHA SPECTROSCOPY

Client Hanford

Contract TRB-SBB-207925

Case no SDG H0198

## RESULTS

| CLIENT SAMPLE ID           | LAB<br>SAMPLE ID | RAW<br>TEST FIX | SUF-<br>PLANCHET | Americium<br>Curium 244 | 241 |
|----------------------------|------------------|-----------------|------------------|-------------------------|-----|
| Preparation batch 2785-118 |                  |                 |                  |                         |     |
| BOPPC1                     | N808085-01       | 7492-001        | U                | U                       |     |
| BOPPC2                     | N808085-02       | 7492-002        | U                | U                       |     |
| BOPPC3                     | N808085-03       | 7492-003        | U                | U                       |     |
| BLK (QC ID=28921)          | N808085-05       | 7492-005        | U                | U                       |     |
| LCS (QC ID=28920)          | N808085-04       | 7492-004        | ok               | ok                      |     |
| Duplicate (N808085-01)     | N808085-06       | 7492-006        | ok               | ok                      |     |

Nominal values and limits from method RDLs (pCi/L)  
 202-S Bldg-Pu Loadout Hood-Other Liq

## METHOD PERFORMANCE

| CLIENT SAMPLE ID  | LAB<br>SAMPLE ID | RAW<br>TEST FIX | SUF-<br>pCi/L | MAX MDA<br>L | ALIQ<br>L | PREP<br>FAC | DILU-<br>TION | YIELD<br>% | EFF<br>% | COUNT<br>min | FWHM<br>keV | DRIFT<br>KeV | DAYS<br>HELD | ANAL-<br>PREPARED | YZED   | DETECTOR |
|---|------------------|-----------------|---------------|--------------|-----------|-------------|---------------|------------|----------|--------------|-------------|--------------|--------------|-------------------|--------|----------|
| Preparation batch 2785-118 2σ prep error 5.0 % Reference Lab Notebook #2785 pg. 118 |                  |                 |               |              |           |             |               |            |          |              |             |              |              |                   |        |          |
| BOPPC1  | N808085-01       |                 | 0.15          | 0.100        |           |             |               | 81         | 1080     |              |             | 23           | 09/02/98     | 09/02             | SS-056 |          |
| BOPPC2  | N808085-02       |                 | 0.11          | 0.100        |           |             |               | 74         | 1080     |              |             | 23           | 09/02/98     | 09/02             | SS-058 |          |
| BOPPC3  | N808085-03       |                 | 0.10          | 0.100        |           |             |               | 82         | 1080     |              |             | 23           | 09/02/98     | 09/02             | SS-059 |          |
| BLK (QC ID=28921)   | N808085-05       |                 | 0.14          | 0.100        |           |             |               | 76         | 1080     |              |             |              | 09/02/98     | 09/02             | SS-065 |          |
| LCS (QC ID=28920)   | N808085-04       |                 | 0.13          | 0.100        |           |             |               | 82         | 1080     |              |             |              | 09/02/98     | 09/02             | SS-062 |          |
| Duplicate (N808085-01)  | N808085-06       |                 | 0.12          | 0.100        |           |             |               | 71         | 1080     |              |             | 23           | 09/02/98     | 09/02             | SS-066 |          |
| (QC ID=28922)   |                  |                 |               |              |           |             |               |            |          |              |             |              |              |                   |        |          |

Nominal values and limits from method 0.100 20-105 700 100

PROCEDURES RP-070 Sample Dissolution - HF Method, rev 0  
 RP-941 Plutonium Purification - Small Aliquot, rev 0  
 RP-961 Americium-Curium Purification - Small Aliquot, rev 0

AVERAGES ± 2 SD MDA 0.12 ± 0.037  
 FOR 6 SAMPLES YIELD 78 ± 9

METHOD SUMMARIES

Page 3

SUMMARY DATA SECTION

Page 17

Lab id TMANC  
 Protocol Hanford  
 Version Ver 1.0  
 Form DVD-CMS  
 Version 3.06  
 Report date 10/12/98

## TMA/RICHMOND

SAMPLE DELIVERY GROUP H0198

Test SR Matrix LIQUID  
 SDG 7492  
 Contact N. Joseph Verville

## METHOD SUMMARY

TOTAL STRONTIUM IN LIQUIDS  
 BETA COUNTING

Client Hanford  
 Contract TRB-SBB-207925  
 Case no SDG H0198

## RESULTS

| CLIENT SAMPLE ID           | LAB<br>SAMPLE ID | RAW<br>TEST FIX | SUF-<br>PLANCHET | Strontium 90 |
|----------------------------|------------------|-----------------|------------------|--------------|
| Preparation batch 2785-118 |                  |                 |                  |              |
| B0PPC1                     | N808085-01       | 7492-001        | U                |              |
| B0PPC2                     | N808085-02       | 7492-002        | U                |              |
| B0PPC3                     | N808085-03       | 7492-003        | U                |              |
| BLK (QC ID=28921)          | N808085-05       | 7492-005        | U                |              |
| LCS (QC ID=28920)          | N808085-04       | 7492-004        | ok               |              |
| Duplicate (N808085-01)     | N808085-06       | 7492-006        | - U              |              |

Nominal values and limits from method RDLs (pCi/L) 2.0  
 202-S Bldg-Pu Loadout Hood-Other Liq

## METHOD PERFORMANCE

| CLIENT SAMPLE ID   | LAB<br>SAMPLE ID | RAW<br>TEST FIX | SUF-<br>pCi/L | MDA<br>L | ALIQ<br>L | PREP<br>FAC | DILU-<br>TION | YIELD<br>% | EFF<br>% | COUNT<br>min | FWHM<br>keV | DRIFT<br>KeV | DAYS<br>HELD | ANAL-<br>PREPARED | YZED  | DETECTOR |
|--|------------------|-----------------|---------------|----------|-----------|-------------|---------------|------------|----------|--------------|-------------|--------------|--------------|-------------------|-------|----------|
| Preparation batch 2785-118 2σ prep error 10.0 % Reference Lab Notebook #2785 pg. 118 |                  |                 |               |          |           |             |               |            |          |              |             |              |              |                   |       |          |
| B0PPC1   | N808085-01       |                 | 2.2           | 0.100    |           |             |               | 81         | 400      |              |             |              | 17           | 08/27/98          | 08/27 | GRB-227  |
| B0PPC2   | N808085-02       |                 | 2.0           | 0.100    |           |             |               | 86         | 400      |              |             |              | 17           | 08/27/98          | 08/27 | GRB-228  |
| B0PPC3   | N808085-03       |                 | 2.5           | 0.100    |           |             |               | 76         | 400      |              |             |              | 17           | 08/27/98          | 08/27 | GRB-229  |
| BLK (QC ID=28921)  | N808085-05       |                 | 2.3           | 0.100    |           |             |               | 81         | 400      |              |             |              |              | 08/27/98          | 08/27 | GRB-231  |
| LCS (QC ID=28920)  | N808085-04       |                 | 2.6           | 0.100    |           |             |               | 79         | 200      |              |             |              |              | 08/27/98          | 08/27 | GRB-217  |
| Duplicate (N808085-01)   | N808085-06       |                 | 2.2           | 0.100    |           |             |               | 80         | 400      |              |             |              | 17           | 08/27/98          | 08/27 | GRB-232  |
| (QC ID=28922)  |                  |                 |               |          |           |             |               |            |          |              |             |              |              |                   |       |          |

Nominal values and limits from method 2.0 1.00 100 180

PROCEDURES REFERENCE SR98/90  
 RP-500 Strontium - Initial Separation, rev 0  
 RP-519 Strontium-89,90 Demounting and Yttrium  
 Purification, rev 0

AVERAGES ± 2 SD MDA 2.3 ± 0.44  
 FOR 6 SAMPLES YIELD 80 ± 7

## METHOD SUMMARIES

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## SUMMARY DATA SECTION

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Lab id TMANC  
 Protocol Hanford  
 Version Ver 1.0  
 Form DVD-CMS  
 Version 1.06  
 Report date 10/12/98

## TMA/RICHMOND

SAMPLE DELIVERY GROUP H0198

Test 80A Matrix LIQUIDSDG 7492Contact N. Joseph Verville

## METHOD SUMMARY

GROSS ALPHA IN LIQUID SAMPLES

GAS PROPORTIONAL COUNTING

Client HanfordContract TRB-SBB-207925Case no SDG H0198

## RESULTS

| CLIENT SAMPLE ID                      | LAB<br>SAMPLE ID | RAW<br>TEST | SUF-<br>FIX | PLANCHET     | 1: Gross<br>Alpha | 2: Sum, Alpha<br>Emitters | RESULT RATIO (%)<br>2+1 2σ |
|---------------------------------------|------------------|-------------|-------------|--------------|-------------------|---------------------------|----------------------------|
| Preparation batch 2785-118            |                  |             |             |              |                   |                           |                            |
| B0PPC1                                | N808085-01       | 80          |             | 7492-001     | U                 |                           |                            |
| B0PPC2                                | N808085-02       | 80          |             | 7492-002     | U                 |                           |                            |
| B0PPC3                                | N808085-03       | 80          |             | 7492-003     | U                 |                           |                            |
| BLK (QC ID=28921)                     | N808085-05       | 80          |             | 7492-005     | U                 |                           |                            |
| LCS (QC ID=28920)                     | N808085-04       | 80          |             | 7492-004     | ok                |                           |                            |
| Duplicate (N808085-02)                | N808085-07       | 80          |             | 7492-007     | -                 | U                         |                            |
| Nominal values and limits from method |                  |             |             |              |                   |                           |                            |
|                                       |                  |             |             | RDLs (pCi/L) | 3.0               |                           |                            |
| 202-S Bldg-Pu Loadout Hood-Other Liq  |                  |             |             |              |                   |                           | Average                    |

## METHOD PERFORMANCE

| CLIENT SAMPLE ID   | LAB<br>SAMPLE ID | RAW<br>TEST | SUF-<br>FIX | MDA<br>pCi/L | ALIQ<br>L | PREP<br>FAC | DILU-<br>TION | RESID<br>mg | EFF<br>% | COUNT<br>min | FWHM<br>keV | DRIFT<br>KeV | DAYS<br>HELD | ANAL-<br>PREPARED | YZED    | DETECTOR |
|--|------------------|-------------|-------------|--------------|-----------|-------------|---------------|-------------|----------|--------------|-------------|--------------|--------------|-------------------|---------|----------|
| Preparation batch 2785-118 2σ prep error 20.0 % Reference Lab Notebook #2785 pg. 118 |                  |             |             |              |           |             |               |             |          |              |             |              |              |                   |         |          |
| B0PPC1   | N808085-01       | 80          |             | 1.1          | 0.100     |             |               | <u>1</u>    | 396      |              |             | 15           | 08/25/98     | 08/25             | GRB-113 |          |
| B0PPC2   | N808085-02       | 80          |             | 2.2          | 0.100     |             |               | <u>0</u>    | 100      |              |             | 17           | 08/25/98     | 08/27             | GRB-113 |          |
| B0PPC3   | N808085-03       | 80          |             | 1.3          | 0.100     |             |               | <u>1</u>    | 396      |              |             | 15           | 08/25/98     | 08/25             | GRB-115 |          |
| BLK (QC ID=28921)  | N808085-05       | 80          |             | 2.9          | 0.100     |             |               | 31          | 100      |              |             |              | 08/25/98     | 08/26             | GRB-111 |          |
| LCS (QC ID=28920)  | N808085-04       | 80          |             | 1.5          | 0.100     |             |               | 30          | 396      |              |             |              | 08/25/98     | 08/25             | GRB-116 |          |
| Duplicate (N808085-02)   | N808085-07       | 80          |             | 2.4          | 0.100     |             |               | <u>0</u>    | 100      |              |             | 16           | 08/25/98     | 08/26             | GRB-112 |          |
| (QC ID=28990)  |                  |             |             |              |           |             |               |             |          |              |             |              |              |                   |         |          |
| Nominal values and limits from method  |                  |             |             |              |           |             |               |             |          |              |             |              |              |                   |         |          |
|  |                  |             |             | 3.0          | 0.100     |             |               | 5-150       | 100      |              |             | 180          |              |                   |         |          |

PROCEDURES REFERENCE EPA900.0  
EP-120 Gross Alpha and Gross Beta in Environmental Water,  
rev 2

AVERAGES ± 2 SD MDA 1.9 ± 1.4  
FOR 6 SAMPLES RESIDUE 10 ± 32

## METHOD SUMMARIES

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## SUMMARY DATA SECTION

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Lab id TMANCProtocol HanfordVersion Ver 1.0Form DVD-CMSVersion 3.06Report date 10/12/98

## TMA/RICHMOND

SAMPLE DELIVERY GROUP H0198

Test 80B Matrix LIQUID  
 SDG 7492  
 Contact N. Joseph Verville

# METHOD SUMMARY

GROSS BETA IN LIQUID SAMPLES  
 GAS PROPORTIONAL COUNTING

Client Hanford  
 Contract TRB-SBB-207925  
 Case no SDG H0198

## RESULTS

|                                       | LAB        | RAW  | SUF-         | 1: Gross | 2: Sum, Beta | RESULT RATIO (%) |     |    |
|---------------------------------------|------------|------|--------------|----------|--------------|------------------|-----|----|
| CLIENT SAMPLE ID                      | SAMPLE ID  | TEST | FIX          | PLANCHET | Beta         | Emitters         | 2-1 | 2σ |
| <hr/>                                 |            |      |              |          |              |                  |     |    |
| Preparation batch 2785-118            |            |      |              |          |              |                  |     |    |
| B0PPC1                                | N808085-01 | 80   |              | 7492-001 | U            |                  |     |    |
| B0PPC2                                | N808085-02 | 80   |              | 7492-002 | U            |                  |     |    |
| B0PPC3                                | N808085-03 | 80   |              | 7492-003 | U            |                  |     |    |
| BLK (QC ID=28921)                     | N808085-05 | 80   |              | 7492-005 | U            |                  |     |    |
| LCS (QC ID=28920)                     | N808085-04 | 80   |              | 7492-004 | ok           |                  |     |    |
| Duplicate (N808085-02)                | N808085-07 | 80   |              | 7492-007 | -            | U                |     |    |
| <hr/>                                 |            |      |              |          |              |                  |     |    |
| Nominal values and limits from method |            |      | RDLs (pCi/L) |          | 4.0          |                  |     |    |
| 202-S Bldg-Pu Loadout Hood-Other Liq  |            |      |              |          |              | Average          |     |    |

## METHOD PERFORMANCE

| CLIENT SAMPLE ID   | LAB<br>SAMPLE ID | RAW<br>TEST | SUF-<br>FIX | MDA<br>pCi/L | ALIQ<br>ml | PREP<br>FAC | DILU-<br>TION | RESID<br>mg | EFF<br>% | COUNT<br>min | FWHM<br>keV | DRIFT<br>KeV | DAYS<br>HELD | ANAL-<br>PREPARED | YZED | DETECTOR |
|--|------------------|-------------|-------------|--------------|------------|-------------|---------------|-------------|----------|--------------|-------------|--------------|--------------|-------------------|------|----------|
| Preparation batch 2785-118 2σ prep error 15.0 % Reference Lab Notebook #2785 pg. 118 |                  |             |             |              |            |             |               |             |          |              |             |              |              |                   |      |          |
| B0PPC1   | N808085-01       | 80          |             | 2.8          | 0.100      |             |               | <u>1</u>    | 396      | 15           | 08/25/96    | 08/25        | GRB-113      |                   |      |          |
| B0PPC2   | N808085-02       | 80          |             | <u>5.6</u>   | 0.100      |             |               | <u>0</u>    | 100      | 17           | 08/25/98    | 08/27        | GRB-113      |                   |      |          |
| B0PPC3   | N808085-03       | 80          |             | 2.8          | 0.100      |             |               | <u>1</u>    | 396      | 15           | 08/25/98    | 08/25        | GRB-115      |                   |      |          |
| BLK (QC ID=28921)  | N808085-05       | 80          |             | <u>6.2</u>   | 0.100      |             |               | 31          | 100      |              | 08/25/98    | 08/26        | GRB-111      |                   |      |          |
| LCS (QC ID=28920)  | N808085-04       | 80          |             | 3.8          | 0.100      |             |               | 30          | 396      |              | 08/25/98    | 08/25        | GRB-116      |                   |      |          |
| Duplicate (N808085-02)   | N808085-07       | 80          |             | <u>6.4</u>   | 0.100      |             |               | <u>0</u>    | 100      | 16           | 08/25/98    | 08/26        | GRB-112      |                   |      |          |
| (QC ID=28990)  |                  |             |             |              |            |             |               |             |          |              |             |              |              |                   |      |          |
| Nominal values and limits from method  |                  |             |             |              |            |             |               |             |          |              |             |              |              |                   |      |          |
|  |                  |             |             | 4.0          | 0.100      |             |               | 5-150       | 100      |              | 180         |              |              |                   |      |          |

PROCEDURES REFERENCE EPA900.0  
 EP-120 Gross Alpha and Gross Beta in Environmental Water,  
 rev 2

AVERAGES ± 2 SD MDA 4.6 ± 3.3  
 FOR 6 SAMPLES RESIDUE 10 ± 31

## METHOD SUMMARIES

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## SUMMARY DATA SECTION

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Lab id TMANC  
 Protocol Hanford  
 Version Ver 1.0  
 Form DVD-CMS  
 Version 3.06  
 Report date 10/12/98

## TMA/RICHMOND

SAMPLE DELIVERY GROUP H0198

Test GAM Matrix LIQUIDSDG 7492Contact N. Joseph Verville

## METHOD SUMMARY

GAMMA SCAN IN LIQUID

GAMMA SPECTROSCOPY

Client HanfordContract TRB-SBB-207925Case no SDG H0198

## RESULTS

| CLIENT SAMPLE ID           | LAB<br>SAMPLE ID | RAW<br>TEST FIX | SUF-<br>PLANCHET | Cobalt 60 | Cesium 137 |
|----------------------------|------------------|-----------------|------------------|-----------|------------|
| Preparation batch 2785-118 |                  |                 |                  |           |            |
| B0PPC1                     | N808085-01       | 7492-001        | U                | U         |            |
| B0PPC2                     | N808085-02       | 7492-002        | U                | U         |            |
| B0PPC3                     | N808085-03       | 7492-003        | U                | U         |            |
| BLK (QC ID=28921)          | N808085-05       | 7492-005        | U                | U         |            |
| LCS (QC ID=28920)          | N808085-04       | 7492-004        | ok               | ok        |            |
| Duplicate (N808085-01)     | N808085-06       | 7492-006        | -                | U         | - U        |

Nominal values and limits from method RDLs (pCi/L) 25 15  
 202-S Bldg-Pu Loadout Hood-Other Liq

## METHOD PERFORMANCE

| CLIENT SAMPLE ID   | LAB<br>SAMPLE ID | RAW<br>TEST FIX | SUF-<br>pCi/L | MAX MDA<br>L | ALIQ<br>L | PREP<br>FAC | DILU-<br>TION | YIELD<br>% | EFF<br>% | COUNT<br>min | FWHM<br>keV | DRIFT<br>KeV | DAYS<br>HELD | ANAL-<br>PREPARED | YZED | DETECTOR |
|--|------------------|-----------------|---------------|--------------|-----------|-------------|---------------|------------|----------|--------------|-------------|--------------|--------------|-------------------|------|----------|
| Preparation batch 2785-118 2σ prep error 10.0 % Reference Lab Notebook #2785 pg. 118 |                  |                 |               |              |           |             |               |            |          |              |             |              |              |                   |      |          |
| B0PPC1   | N808085-01       |                 | 16            | 0.500        |           |             |               | 408        |          | 16           |             | 08/26/98     | 01.01.00     |                   |      |          |
| B0PPC2   | N808085-02       |                 | 16            | 0.500        |           |             |               | 408        |          | 16           |             | 08/26/98     | 01.03.00     |                   |      |          |
| B0PPC3   | N808085-03       |                 | 6.0           | 0.500        |           |             |               | 408        |          | 16           |             | 08/26/98     | 01.04.00     |                   |      |          |
| BLK (QC ID=28921)  | N808085-05       |                 | 13            | 0.500        |           |             |               | 485        |          |              |             | 08/27/98     | 01.03.01     |                   |      |          |
| LCS (QC ID=28920)  | N808085-04       |                 | 29            | 0.500        |           |             |               | 420        |          |              |             | 08/26/98     | 08/27        | 01.01.00          |      |          |
| Duplicate (N808085-01)   | N808085-06       |                 | 5.5           | 0.500        |           |             |               | 485        |          | 17           |             | 08/27/98     | 01.04.00     |                   |      |          |
| (QC ID=28922)  |                  |                 |               |              |           |             |               |            |          |              |             |              |              |                   |      |          |
| Nominal values and limits from method  |                  |                 | 15            | 0.500        |           |             |               | 5          |          | 180          |             |              |              |                   |      |          |

PROCEDURES REFERENCE GAMMAHI  
 RP-070 Sample Dissolution - HF Method, rev 0  
 RP-100 Ge(Li) Preparation for Reactor Waste Samples,  
 rev 0

AVERAGES ± 2 SD MDA 14 ± 17  
 FOR 6 SAMPLES YIELD ±

## METHOD SUMMARIES

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## SUMMARY DATA SECTION

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Lab id TMANCProtocol HanfordVersion Ver 1.0Form DVD-CMSVersion 3.06Report date 10/12/98

**TMA/RICHMOND**  
**SAMPLE DELIVERY GROUP H0198**

SDG 7492  
Contact N. Joseph Verville

**REPORT GUIDE**

Client Hanford  
Contract TRB-SBB-207925  
Case no SDG\_H0198

**SAMPLE SUMMARY**

The Sample and QC Summary Reports show all samples, including QC samples, reported in one Sample Delivery Group (SDG).

The Sample Summary Report fully identifies client samples and gives the corresponding lab sample identification. The QC Summary Report shows at the sample level how the lab organized the samples into batches and generated QC samples. The Preparation Batch and Method Summary Reports show this at the analysis level.

The following notes apply to these reports:

- \* LAB SAMPLE ID is the lab's primary identification for a sample.
- \* DEPARTMENT SAMPLE ID is an alternate lab id, for example one assigned by a radiochemistry department in a lab.
- \* CLIENT SAMPLE ID is the client's primary identification for a sample. It includes any sample preparation done by the client that is necessary to identify the sample.
- \* QC BATCH is a lab assigned code that groups samples to be processed and QCed together. These samples should have similar matrices.

QC BATCH is not necessarily the same as SDG, which reflects samples received and reported together.

- \* All Lab Control Samples, Method Blanks, Duplicates and Matrix Spikes are shown that QC any of the samples. Due to possible reanalyses, not all results for all these QC samples may be relevant to the SDG. The Lab Control Sample, Method Blank, Duplicate, Matrix Spike and Method Summary Reports detail these relationships.

**REPORT GUIDES**

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**SUMMARY DATA SECTION**

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Lab id TMANC  
Protocol Hanford  
Version Ver 1.0  
Form DVD-RG  
Version 3.06  
Report date 10/12/98

**TMA/RICHMOND**  
**SAMPLE DELIVERY GROUP H0198**

SDG 7492  
Contact N. Joseph Verville

**REPORT GUIDE**

Client Hanford  
Contract TRB-SBB-207925  
Case no SDG H0198

**PREPARATION BATCH SUMMARY**

The Preparation Batch Summary Report shows all preparation batches in one Sample Delivery Group (SDG) with information necessary to check the completeness and consistency of the SDG.

The following notes apply to this report:

- \* The preparation batches are shown in the same order as the Method Summary Reports are printed.
- \* Only analyses of planchets relevant to the SDG are included.
- \* Each preparation batch should have at least one Method Blank and LCS in it to validate client sample results.
- \* The QUALIFIERS shown are all qualifiers other than U, J, B, L and H that occur on any analysis in the preparation batch. The Method Summary Report has these qualifiers on a per sample basis.

These qualifiers should be reviewed as follows:

- X Some data has been manually entered or modified.  
Transcription errors are possible.
- P One or more results are 'preliminary'. The data is not ready for final reporting.
- 2 There were two or more results for one analyte on one planchet imported at one time. The results in DVD may not be the same as on the raw data sheets.

Other lab defined qualifiers may occur. In general, these should be addressed in the SDG narrative.

**REPORT GUIDES**

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**SUMMARY DATA SECTION**

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Lab id TMANC  
Protocol Hanford  
Version Ver 1.0  
Form DVD-RG  
Version 3.06  
Report date 10/12/98

**TMA / RICHMOND**  
**SAMPLE DELIVERY GROUP H0198**

SDG 7492  
Contact N. Joseph Verville

**REPORT GUIDE**

Client Hanford  
Contract TRB-SBB-207925  
Case no SDG H0198

**WORK SUMMARY**

The Work Summary Report shows all samples, including QC samples, and all relevant analyses in one Sample Delivery Group (SDG). This report is often useful as supporting documentation for an invoice.

The following notes apply to this report:

- \* TEST is a code for the method used to measure associated analytes. Results and related information for each analyte are on the Data Sheet Report. In special cases, a test code used in the summary data section is not the same as in associated raw data. In this case, both codes are shown on the Work Summary.
- \* SUFFIX is the lab's code to distinguish multiple analyses (recounts, reworks, reanalyses) of a fraction of the sample. The suffix indicates which result is being reported. An empty suffix normally identifies the first attempt to analyze the sample.
- \* The LAB SAMPLE ID, TEST and SUFFIX uniquely identify all supporting data for a result. The Method Summary Report for each TEST has method performance data, such as yield, for each lab sample id and suffix and procedures used in the method.
- \* PLANCHET is an alternate lab identifier for work done for one test. It, combined with the TEST and SUFFIX, may be the best link to raw data.
- \* For QC samples, only analyses that directly QC some regular sample are shown. The Lab Control Sample, Method Blank, Duplicate, Matrix Spike and Method Summary Reports detail these relationships.
- \* The SAS (Special Analytical Services) Number is a client or lab assigned code that reflects special processing for samples, such as rapid turn around. Counts of tests done are lists by SAS number since it is likely to affect prices.

**REPORT GUIDES**

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**SUMMARY DATA SECTION**

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Lab id TMANC  
Protocol Hanford  
Version Ver 1.0  
Form DVD-RG  
Version 3.06  
Report date 10/12/98

**TMA/RICHMOND**  
**SAMPLE DELIVERY GROUP H0198**

SDG 7492  
Contact N. Joseph Verville

**REPORT GUIDE**

Client Hanford  
Contract TRB-SBB-207925  
Case no SDG H0198

**DATA SHEET**

The Data Sheet Report shows all results and primary supporting information for one client sample or Method Blank. This report corresponds to both the CLP Inorganics and Organics Data Sheet.

The following notes apply to this report:

- \* TEST is a code for the method used to measure an analyte. If the TEST is empty, no data is available; the analyte was not analyzed for.
- \* The LAB SAMPLE ID and TEST uniquely identify work within the Summary Data Section of a Data Package. The Work Summary and Method Summary Reports further identify raw data that underlies this work.

The Method Summary Report for each TEST has method performance data, such as yield, for each Lab Sample ID and a list of procedures used in the method.

- \* ERRORS can be labeled TOTAL or COUNT. TOTAL implies a preparation (non-counting method) error has been added, as square root of sum of squares, to the counting error denoted by COUNT. The preparation errors, which may vary by preparation batch, are shown on the Method Summary Report.
- \* A RESULT can be 'N.R.' (Not Reported). This means the lab did this work but chooses not to report it now, possibly because it was reported at another time.
- \* When reporting a Method Blank, a RESULT can be 'N.A.' (Not Applicable). This means there is no reported client sample work in the same preparation batch as the Blank's result. This is likely to occur when the Method Blank is associated with reanalyses of selected work for a few samples in the SDG.

The following qualifiers are defined by the DVD system:

U The RESULT is less than the MDA (Minimum Detectable Activity).

**REPORT GUIDES**

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**SUMMARY DATA SECTION**

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Lab id TMANC  
Protocol Hanford  
Version Ver 1.0  
Form DVD-RG  
Version 3.06  
Report date 10/12/98

**TMA/RICHMOND**  
**SAMPLE DELIVERY GROUP H0198**

SDG 7492  
Contact N. Joseph Verville

**GUIDE, cont.**

Client Hanford  
Contract TRB-SBB-207925  
Case no SDG H0198

**DATA SHEET**

If the MDA is blank, the ERROR is used as the limit.

- J The RESULT is less than the RDL (Required Detection Limit) and no U qualifier is assigned.
- B A Method Blank associated with this sample had a result without a U flag and, after correcting for possibly different aliquots, that result is greater than or equal to the MDA for this sample.

Normally, B is not assigned if U is. When method blank subtraction is shown on this report, B flags are assigned based on the unsubtracted values while U's are assigned based on the subtracted ones. Both flags can be assigned in this case.

For each sample result, all Method Blank results in the same preparation batch are compared. The Method Summary Report documents this and other QC relationships.

- L Some Lab Control Sample that QC's this sample had a low recovery. The lab can disable assignment of this qualifier.
- H Similar to 'L' except the recovery was high.
- P The RESULT is 'preliminary'.
- X Some data necessary to compute the RESULT, ERROR or MDA was manually entered or modified.
- 2 There were two or more results available for this analyte. The reported result may not be the same as in the raw data.

Other qualifiers are lab defined. Definitions should be in the SDG narrative.

The following values are underlined to indicate possible problems:

- \* An MDA is underlined if it is bigger than its RDL.

**REPORT GUIDES**

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**SUMMARY DATA SECTION**

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Lab id TMANC  
Protocol Hanford  
Version Ver 1.0  
Form DVD-RG  
Version 3.06  
Report date 10/12/98

**TMA/RICHMOND**  
SAMPLE DELIVERY GROUP H0198

SDG 7492  
Contact N. Joseph Verville

**GUIDE, cont.**

Client Hanford  
Contract TRB-SBB-207925  
Case no SDG H0198

**DATA SHEET**

- \* An ERROR is underlined if the 1.645 sigma counting error is bigger than both the MDA and the RESULT, implying that the MDA may not be a good estimate of the 'real' minimum detectable activity.
- \* A negative RESULT is underlined if it is less than the negative of its 2 sigma counting ERROR.
- \* When reporting a Method Blank, a RESULT is underlined if greater than its MDA. If the MDA is blank, the 2 sigma counting error is used in the comparison.

**REPORT GUIDES**

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**SUMMARY DATA SECTION**

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Lab id TMANC  
Protocol Hanford  
Version Ver 1.0  
Form DVD-RG  
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**TMA / RICHMOND**  
SAMPLE DELIVERY GROUP H0198

SDG 7492  
Contact N. Joseph Verville

**REPORT GUIDE**

Client Hanford  
Contract TRB-SBB-207925  
Case no SDG H0198

**LAB CONTROL SAMPLE**

The Lab Control Sample Report shows all results, recoveries and primary supporting information for one Lab Control Sample.

The following notes apply to this report:

- \* All fields in common with the Data Sheet Report have similar usage. Refer to its Report Guide for details.
- \* An amount ADDED is the lab's value for the actual amount spiked into this sample with its ERROR an estimate of the error of this amount.

An amount added is underlined if its ratio to the corresponding RDL is outside protocol specified limits.

- \* REC (Recovery) is RESULT divided by ADDED expressed as a percent.
- \* The first, computed limits for the recovery reflect:
  1. The error of RESULT, including that introduced by rounding the result prior to printing.

If the limits are labeled (TOTAL), they include preparation error in the result. If labeled (COUNT), they do not.
  2. The error of ADDED.
  3. A lab specified, per analyte bias. The bias changes the center of the computed limits.
- \* The second limits are protocol defined upper and lower QC limits for the recovery.
- \* The recovery is underlined if it is outside either of these ranges.

**REPORT GUIDES**

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**SUMMARY DATA SECTION**

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Lab id TMANC  
Protocol Hanford  
Version Ver 1.0  
Form DVD-RG  
Version 3.06  
Report date 10/12/98

**TMA/RICHMOND**  
**SAMPLE DELIVERY GROUP H0198**

SDG 7492  
Contact N. Joseph Verville

**REPORT GUIDE**

Client Hanford  
Contract TRB-SBB-207925  
Case no SDG H0198

**DUPLICATE**

The Duplicate Report shows all results, differences and primary supporting information for one Duplicate and associated Original sample.

The following notes apply to this report:

- \* All fields in common with the Data Sheet Report have similar usage. This applies both to the Duplicate and Original sample data. Refer to the Data Sheet Report Guide for details.

If the Duplicate has data for a TEST and the lab did not do this test to the Original, the Original's RESULTS are underlined.

- \* The RPD (Relative Percent Difference) is the absolute value of the difference of the RESULTS divided by their average expressed as a percent.

If both RESULTS are less than their MDAs, no RPD is computed and a '-' is printed.

For an analyte, if the lab did work for both samples but has data for only one, the MDA from the sample with data is used as the other's result in the RPD.

- \* The first, computed limit is the sum, as square root of sum of squares, of the errors of the results divided by the average result as a percent, hence the relative error of the difference rather than the error of the relative difference. The errors include those introduced by rounding the RESULTS prior to printing.

If this limit is labeled TOT, it includes the preparation error in the RESULTS. If labeled CNT, it does not.

This value reported for this limit is at most 999.

- \* The second limit for the RPD is the larger of:

1. A fixed percentage specified in the protocol.

**REPORT GUIDES**

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**SUMMARY DATA SECTION**

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Protocol Hanford  
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**TMA/RICHMOND**  
SAMPLE DELIVERY GROUP H0198

SDG 7492  
Contact N. Joseph Verville

**GUIDE, cont.**

Client Hanford  
Contract TRB-SBB-207925  
Case no SDG H0198

**DUPLICATE**

2. A protocol factor (typically 2) times the average MDA as a percent of the average result. This limit applies when the results are close to the MDAs.

- \* The RPD is underlined if it is greater than either limit.
- \* If specified by the lab, the second limit column is replaced by the Difference Error Ratio (DER), which is the absolute value of the difference of the results divided by the quadratic sum of their one sigma errors, the same errors as used in the first limit.

Except for differences due to rounding, the DER is the same as the RPD divided by the first RPD limit with the limit scaled to 1 sigma.

- \* The DER is underlined if it is greater than the sigma factor, typically 2 or 3, shown in the header for the first RPD limit.

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**SUMMARY DATA SECTION**

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Protocol Hanford  
Version Ver 1.0  
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# TMA/RICHMOND

SAMPLE DELIVERY GROUP H0198

SDG 7492

Contact N. Joseph Verville

## GUIDE, cont.

Client Hanford

Contract TRB-SBB-207925

Case no SDG H0198

## MATRIX SPIKE

for the recovery.

These limits are left blank if the Original RESULT is more than a protocol defined factor (typically 4) times ADDED. This is a way of accounting for that when the spike is small compared to the amount in the original sample, the recovery is unreliable.

- \* The recovery is underlined (out of spec) if it is outside either of these ranges.

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### SUMMARY DATA SECTION

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Lab id TMANC

Protocol Hanford

Version Ver 1.0

Form DVD-RG

Version 3.06

Report date 10/12/98

**TMA / RICHMOND**  
**SAMPLE DELIVERY GROUP H0198**

SDG 7492  
Contact N. Joseph Verville

**REPORT GUIDE**

Client Hanford  
Contract TRB-SBB-207925  
Case no SDG H0198

**METHOD SUMMARY**

The Method Summary Report has two tables. One shows up to five results measured using one method. The other has performance data for the method. There is one report for each TEST, as used on the Data Sheet Report.

The following notes apply to this report:

- \* Each table is subdivided into sections, one for each preparation batch. A preparation batch is a group of aliquots prepared at roughly the same time in one work area of the lab using the same method.

There should be Lab Control Sample and Method Blank results in each preparation batch since this close correspondence makes the QC meaningful. Depending on lab policy, Duplicates need not occur in each batch since they QC sample dependencies such as matrix effects.

- \* The RAW TEST column shows the test code used in the raw data to identify a particular analysis if it is different than the test code in the header of the report. This occurs in special cases due to method specific details about how the lab labels work.

The Lab Sample or Planchet ID combined with the (Raw) Test Code and Suffix uniquely identify the raw data for each analysis.

- \* If a result is less than both its MDA and RDL, it is replaced by just 'U' on this report. If it is greater than or equal to the RDL but less than the MDA, the result is shown with a 'U' flag.

The J and X flags are as on the data sheet.

- \* Non-U results for Method Blanks are underlined to indicate possible contamination of other samples in the preparation batch. The Method Blank Report has supporting data.
- \* Lab Control Sample and Matrix Spike results are shown as: ok, No data, LOW or HIGH, with the last two underlined. 'No data'

**REPORT GUIDES**

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**SUMMARY DATA SECTION**

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Lab id TMANC  
Protocol Hanford  
Version Ver 1.0  
Form DVD-RG  
Version 3.06  
Report date 10/12/98

**TMA/RICHMOND**  
**SAMPLE DELIVERY GROUP H0198**

SDG 7492  
Contact N. Joseph Verville

**GUIDE, cont.**

Client Hanford  
Contract TRB-SBB-207925  
Case no SDG H0198

**METHOD SUMMARY**

means no amount ADDED was specified. 'LOW' and 'HIGH' correspond to when the recovery is underlined on the Lab Control Sample or Matrix Spike Report. See these reports for supporting data.

- \* Duplicate sample results are shown as: ok, No data, or OUT, with the last two underlined. 'No data' means there was no original sample data found for this duplicate. 'OUT' corresponds to when the RPD is underlined on the Duplicate Report. See this report for supporting data.
- \* If the MDA column is labeled 'MAX MDA', there was more than one result measured by the reported method and the MDA shown is the largest MDA. If not all these results have the same RDL, the MAX MDA reflects only those results with RDL equal to the smallest one.

MDAs are underlined if greater than the printed RDL.

- \* Aliquots are underlined if less than the nominal value specified for the method.
- \* Preparation factors are underlined if greater than the nominal value specified for the method.
- \* Dilution factors are underlined if greater than the nominal value specified for the method.
- \* Residues are underlined if outside the range specified for the method. Residues are not printed if yields are.
- \* Yields, which may be gravimetric, radiometric or some type of recovery depending on the method, are underlined if outside the range specified for the method.
- \* Efficiencies are underlined if outside the range specified for the method. Efficiencies are detector and geometry dependent so this test is only approximate.

**REPORT GUIDES**

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**SUMMARY DATA SECTION**

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Lab id TMANC  
Protocol Hanford  
Version Ver 1.0  
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**TMA/RICHMOND**

SAMPLE DELIVERY GROUP H0198

SDG 7492  
Contact N. Joseph Verville**GUIDE, cont.**Client Hanford  
Contract TRB-SBB-207925  
Case no SDG H0198**METHOD SUMMARY**

- \* Count times are underlined if less than the nominal value specified for the method.
- \* Resolutions (as FWHM; Full Width at Half Max) are underlined if greater than the method specified limit.
- \* Tracer drifts are underlined if their absolute values are greater than the method specified limit. Tracer drifts are not printed if percent moistures are.
- \* Days Held are underlined if greater than the holding time specified in the protocol.
- \* Analysis dates are underlined if before their planchet's preparation date or, if a limit is specified, too far after it.

For some methods, ratios as percentages and error estimates for them are computed for pairs of results. A ratio column header like '1+3' means the ratio of the first result column and the third result column.

Ratios are not computed for Lab Control Sample, Method Blank or Matrix Spike results since their matrices are not necessarily similar to client samples'.

The error estimate for a ratio of results from one planchet reflects only counting errors since other errors should be correlated. For a ratio involving different planchets, if QC limits are computed based on total errors, the error for the ratio allows for the preparation errors for the planchets.

The ratio is underlined (out of spec) if the absolute value of its difference from the nominal value is greater than its error estimate. If no nominal value is specified, this test is not done.

For Gross Alpha or Gross Beta results, there may be a column showing the sum of other Alpha or Beta emitters. This sum includes all relevant

**REPORT GUIDES**

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**SUMMARY DATA SECTION**

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Protocol Hanford  
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**TMA/RICHMOND**  
**SAMPLE DELIVERY GROUP H0198**

SDG 7492  
Contact N. Joseph Verville

**GUIDE, cont.**

Client Hanford  
Contract TRB-SBB-207925  
Case no SDG H0198

**METHOD SUMMARY**

results in the DVD database, whether reported or not. Results in the sum are weighted by a particles/decay value specified by the lab for each relevant analyte. Results less than their MDA are not included. No sums are computed for Lab Control, Method Blank or Matrix Spike samples since their various planchets may not be physically related.

If a ratio of total isotopic to Gross Alpha or Beta is shown, the error for the ratio reflects both the error in the Gross result and the sum, as square root of sum of squares, of the errors in the isotopic results.

For total elemental uranium or thorium results, there may be a column showing the total weight computed from associated isotopic results. Ignoring results less than their MDAs, this is a weighted sum of the isotopic results. The weights depend on the molecular weight and half-life of each isotope so as to convert activities (decays) to weight (atoms).

If a ratio of total computed to measured elemental uranium or thorium is shown, the error for the ratio reflects the errors in all the measurements.

**REPORT GUIDES**

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Lab id TMANC  
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## Case Narrative

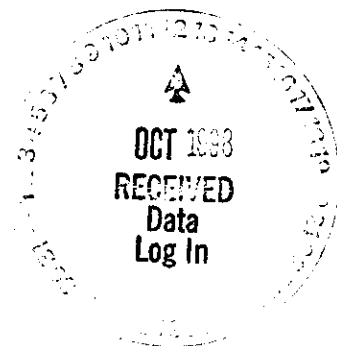
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### 1.0 GENERAL

Thermo Nutech Sample Delivery Group H0198 is comprised of three liquid samples designated under SAF No. B98-060 with a Project Designation of : 202-S Building - Plutonium Loadout Hood - Other Liquid.

The chain-of-custody documents requested Sr-90 analyses be performed. A total strontium analysis was performed and the data was reported as total strontium in the original data package. A total strontium analysis was performed for these samples for several reasons. The first reason is that this work was to be performed on a short turn-around time basis, and a true analysis for Sr90 which includes dissolution, decontamination, ingrowth, counting Sr, milking Y, providing decay for Y90 etc, is 42 calendar days. Thermo Nutech had 15 to no more than 21 days to perform the analysis. The entire technical process is necessary only if Sr89 is present and then if it is required to be analyzed and reported. Since the request was for Sr90 and there is no Sr89 in the samples and since the TAT was substantially less than the required 42 days for the full analysis the expedient of performing Sr chemistry rather than Y chemistry was taken ie. we did not milk for Y90 and this is not necessary if Sr89 is not a required analyte.

Thermo Nutechs system "labels" this process a total strontium analysis which, since Sr89 is not required to be reported, is the same thing we do for a Sr90 analysis. The chemistry, counting, calculations, etc. are exactly the same. Should there actually be Sr89 in the sample then the results would be biased high, unless corrected. This is not the case for the samples in SDG H0198.



**TMA/RICHMOND**  
SAMPLE DELIVERY GROUP H0198

**SAMPLE SUMMARY**

SDG 7492  
Contact N. Joseph Verville

Client Hanford  
Contract TRB-SBB-207925  
Case no SDG H0198

| CLIENT SAMPLE ID       | LOCATION | MATRIX | LEVEL | LAB        |         | CHAIN OF   |                |
|------------------------|----------|--------|-------|------------|---------|------------|----------------|
|                        |          |        |       | SAMPLE ID  | SAF NO  | CUSTODY    | COLLECTED      |
| B0PPC1                 | 200 West | LIQUID |       | N808085-01 | B98-060 | B98-060-09 | 08/10/98 15:00 |
| B0PPC2                 | 200 West | LIQUID |       | N808085-02 | B98-060 | B98-060-09 | 08/10/98 15:05 |
| B0PPC3                 | 200 West | LIQUID |       | N808085-03 | B98-060 | B98-060-09 | 08/10/98 15:20 |
| Method Blank           |          | LIQUID |       | N808085-05 | B98-060 |            |                |
| Lab Control Sample     |          | LIQUID |       | N808085-04 | B98-060 |            |                |
| Duplicate (N808085-01) | 200 West | LIQUID |       | N808085-06 | B98-060 |            | 08/10/98 15:00 |
| Duplicate (N808085-02) | 200 West | LIQUID |       | N808085-07 | B98-060 |            | 08/10/98 15:05 |

SAMPLE SUMMARY

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SUMMARY DATA SECTION

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Lab id TMANC  
Protocol Hanford  
Version Ver 1.0  
Form DVD-CS  
Version 3.06  
Report date 10/10/98

## TMA/RICHMOND

SAMPLE DELIVERY GROUP H0198

SDG 7492

Contact N. Joseph Verville

## QC SUMMARY

Client HanfordContract TRB-SBB-207925Case no SDG H0198

| QC BATCH | CHAIN OF CUSTODY | CLIENT SAMPLE ID       | MATRIX | SOLIDS | SAMPLE AMOUNT | BASIS AMOUNT | DAYS SINCE RECEIVED | LAB COLL | LAB SAMPLE ID | DEPARTMENT SAMPLE ID |
|----------|------------------|------------------------|--------|--------|---------------|--------------|---------------------|----------|---------------|----------------------|
| 7492     | B98-060-09       | B0PPC1                 | LIQUID |        |               |              | 08/18/98            | 8        | N808085-01    | 7492-001             |
|          |                  | B0PPC2                 | LIQUID |        |               |              | 08/18/98            | 8        | N808085-02    | 7492-002             |
|          |                  | B0PPC3                 | LIQUID |        |               |              | 08/18/98            | 8        | N808085-03    | 7492-003             |
|          |                  | Method Blank           | LIQUID |        |               |              |                     |          | N808085-05    | 7492-005             |
|          |                  | Lab Control Sample     | LIQUID |        |               |              |                     |          | N808085-04    | 7492-004             |
|          |                  | Duplicate (N808085-01) | LIQUID |        |               |              | 08/18/98            | 8        | N808085-06    | 7492-006             |
|          |                  | Duplicate (N808085-02) | LIQUID |        |               |              | 08/18/98            | 8        | N808085-07    | 7492-007             |

QC SUMMARY

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SUMMARY DATA SECTION

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Lab id TMANCProtocol HanfordVersion Ver 1.0Form DVD-QSVersion 3.06Report date 10/10/98

## TMA/RICHMOND

SAMPLE DELIVERY GROUP H0198

SDG 7492  
Contact N. Joseph Verville

## PREP BATCH SUMMARY

Client Hanford  
Contract TRB-SBB-207925  
Case no SDG H0198

| TEST                      | MATRIX | METHOD                         | PREPARATION | ERROR | PLANCHETS ANALYZED |      |    |       | QUALI- |          |         |
|---------------------------|--------|--------------------------------|-------------|-------|--------------------|------|----|-------|--------|----------|---------|
|                           |        |                                | BATCH       | 2σ %  | CLIENT             | MORE | RE | BLANK | LCS    | DUP/ORIG | MS/ORIG |
| Alpha Spectroscopy        |        |                                |             |       |                    |      |    |       |        |          |         |
| NP                        | LIQUID | Neptunium in liquids           | 2785-118    | 5.0   | 3                  |      |    | 1     | 1      | 1/1      |         |
| PU                        | LIQUID | Plutonium-238,239/240, Liquid  | 2785-118    | 5.0   | 3                  |      |    | 1     | 1      | 1/1      |         |
| TP                        | LIQUID | Americium 241/Curium in Liquid | 2785-118    | 5.0   | 3                  |      |    | 1     | 1      | 1/1      |         |
| Beta Counting             |        |                                |             |       |                    |      |    |       |        |          |         |
| SR                        | LIQUID | Strontium-90 in Liquid         | 2785-118    | 10.0  | 3                  |      |    | 1     | 1      | 1/1      |         |
| Gas Proportional Counting |        |                                |             |       |                    |      |    |       |        |          |         |
| 80A                       | LIQUID | Gross Alpha in Liquid Samples  | 2785-118    | 20.0  | 3                  |      |    | 1     | 1      | 1/1      |         |
| 80B                       | LIQUID | Gross Beta in Liquid Samples   | 2785-118    | 15.0  | 3                  |      |    | 1     | 1      | 1/1      |         |
| Gamma Spectroscopy        |        |                                |             |       |                    |      |    |       |        |          |         |
| GAM                       | LIQUID | Gamma Scan in Liquid           | 2785-118    | 10.0  | 3                  |      |    | 1     | 1      | 1/1      | X       |

Duplicates and Matrix Spikes are those with original (Client) sample in this Sample Delivery Group.

Blank and LCS planchets are those in the same preparation batch as some Client, Duplicate or Spike sample.

PREP BATCH SUMMARY

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SUMMARY DATA SECTION

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 Lab id TMANC  
 Protocol Hanford  
 Version Ver 1.0  
 Form DVD-PBS  
 Version 3.06  
 Report date 10/10/98

## TMA/RICHMOND

SAMPLE DELIVERY GROUP H0198

SDG 7492

Contact N. Joseph Verville

## WORK SUMMARY

Client HanfordContract TRB-SBB-207925Case no SDG H0198

| CLIENT SAMPLE ID   |         | LAB SAMPLE ID |          |        |          |          |          |    |                                |  |  |
|--------------------|---------|---------------|----------|--------|----------|----------|----------|----|--------------------------------|--|--|
| LOCATION           | MATRIX  | COLLECTED     |          | SUF-   |          |          |          |    |                                |  |  |
| CUSTODY            | SAF No  | RECEIVED      | PLANCHET | TEST   | FIX      | ANALYZED | REVIEWED | BY | METHOD                         |  |  |
| BOPPC1             |         | N808085-01    | 7492-001 | 80A/80 | 08/25/98 | 09/09/98 | NJV      |    | Gross Alpha in Liquid Samples  |  |  |
| 200 West           |         | 08/10/98      | 7492-001 | 80B/80 | 08/25/98 | 09/09/98 | NJV      |    | Gross Beta in Liquid Samples   |  |  |
| B98-060-09         | B98-060 | 08/18/98      | 7492-001 | GAM    | 08/26/98 | 09/09/98 | NJV      |    | Gamma Scan in Liquid           |  |  |
|                    |         |               | 7492-001 | NP     | 09/07/98 | 09/09/98 | NJV      |    | Neptunium in liquids           |  |  |
|                    |         |               | 7492-001 | PU     | 08/27/98 | 09/09/98 | NJV      |    | Plutonium-238,239/240, Liquid  |  |  |
|                    |         |               | 7492-001 | SR     | 08/27/98 | 09/09/98 | NJV      |    | Strontium-90 in Liquid         |  |  |
|                    |         |               | 7492-001 | TP     | 09/02/98 | 09/09/98 | NJV      |    | Americium 241/Curium in Liquid |  |  |
| BOPPC2             |         | N808085-02    | 7492-002 | 80A/80 | 08/27/98 | 09/09/98 | NJV      |    | Gross Alpha in Liquid Samples  |  |  |
| 200 West           |         | 08/10/98      | 7492-002 | 80B/80 | 08/27/98 | 09/09/98 | NJV      |    | Gross Beta in Liquid Samples   |  |  |
| B98-060-09         | B98-060 | 08/18/98      | 7492-002 | GAM    | 08/26/98 | 09/09/98 | NJV      |    | Gamma Scan in Liquid           |  |  |
|                    |         |               | 7492-002 | NP     | 09/07/98 | 09/09/98 | NJV      |    | Neptunium in liquids           |  |  |
|                    |         |               | 7492-002 | PU     | 08/27/98 | 09/09/98 | NJV      |    | Plutonium-238,239/240, Liquid  |  |  |
|                    |         |               | 7492-002 | SR     | 08/27/98 | 09/09/98 | NJV      |    | Strontium-90 in Liquid         |  |  |
|                    |         |               | 7492-002 | TP     | 09/02/98 | 09/09/98 | NJV      |    | Americium 241/Curium in Liquid |  |  |
| BOPPC3             |         | N808085-03    | 7492-003 | 80A/80 | 08/25/98 | 09/09/98 | NJV      |    | Gross Alpha in Liquid Samples  |  |  |
| 200 West           |         | 08/10/98      | 7492-003 | 80B/80 | 08/25/98 | 09/09/98 | NJV      |    | Gross Beta in Liquid Samples   |  |  |
| B98-060-09         | B98-060 | 08/18/98      | 7492-003 | GAM    | 08/26/98 | 09/09/98 | NJV      |    | Gamma Scan in Liquid           |  |  |
|                    |         |               | 7492-003 | NP     | 09/07/98 | 09/09/98 | NJV      |    | Neptunium in liquids           |  |  |
|                    |         |               | 7492-003 | PU     | 08/27/98 | 09/09/98 | NJV      |    | Plutonium-238,239/240, Liquid  |  |  |
|                    |         |               | 7492-003 | SR     | 08/27/98 | 09/09/98 | NJV      |    | Strontium-90 in Liquid         |  |  |
|                    |         |               | 7492-003 | TP     | 09/02/98 | 09/09/98 | NJV      |    | Americium 241/Curium in Liquid |  |  |
| Method Blank       |         | N808085-05    | 7492-005 | 80A/80 | 08/26/98 | 09/09/98 | NJV      |    | Gross Alpha in Liquid Samples  |  |  |
|                    |         |               | 7492-005 | 80B/80 | 08/26/98 | 09/09/98 | NJV      |    | Gross Beta in Liquid Samples   |  |  |
|                    | B98-060 |               | 7492-005 | GAM    | 08/27/98 | 09/09/98 | NJV      |    | Gamma Scan in Liquid           |  |  |
|                    |         |               | 7492-005 | NP     | 09/07/98 | 09/09/98 | NJV      |    | Neptunium in liquids           |  |  |
|                    |         |               | 7492-005 | PU     | 08/27/98 | 09/09/98 | NJV      |    | Plutonium-238,239/240, Liquid  |  |  |
|                    |         |               | 7492-005 | SR     | 08/27/98 | 09/09/98 | NJV      |    | Strontium-90 in Liquid         |  |  |
|                    |         |               | 7492-005 | TP     | 09/02/98 | 09/09/98 | NJV      |    | Americium 241/Curium in Liquid |  |  |
| Lab Control Sample |         | N808085-04    | 7492-004 | 80A/80 | 08/25/98 | 09/09/98 | NJV      |    | Gross Alpha in Liquid Samples  |  |  |
|                    |         |               | 7492-004 | 80B/80 | 08/25/98 | 09/09/98 | NJV      |    | Gross Beta in Liquid Samples   |  |  |
|                    | B98-060 |               | 7492-004 | GAM    | 08/27/98 | 09/09/98 | NJV      |    | Gamma Scan in Liquid           |  |  |
|                    |         |               | 7492-004 | NP     | 09/07/98 | 09/09/98 | NJV      |    | Neptunium in liquids           |  |  |
|                    |         |               | 7492-004 | PU     | 08/27/98 | 09/09/98 | NJV      |    | Plutonium-238,239/240, Liquid  |  |  |
|                    |         |               | 7492-004 | SR     | 08/27/98 | 09/09/98 | NJV      |    | Strontium-90 in Liquid         |  |  |
|                    |         |               | 7492-004 | TP     | 09/02/98 | 09/09/98 | NJV      |    | Americium 241/Curium in Liquid |  |  |

## WORK SUMMARY

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## SUMMARY DATA SECTION

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Lab id TMANCProtocol HanfordVersion Ver 1.0Form DVD-CWSVersion 3.06Report date 10/10/98

# TMA/RICHMOND

SAMPLE DELIVERY GROUP H0198

SDG 7492

Contact N. Joseph Verville

## WORK SUMMARY, cont.

Client Hanford

Contract TRB-SBB-207925

Case no SDG H0198

| CLIENT SAMPLE ID       |         | LAB SAMPLE ID |          |        |      |          |          |     |                                |  |
|------------------------|---------|---------------|----------|--------|------|----------|----------|-----|--------------------------------|--|
| LOCATION               | MATRIX  | COLLECTED     |          |        | SUF- |          |          |     |                                |  |
| CUSTODY                | SAF No  | RECEIVED      | PLANCHET | TEST   | FIX  | ANALYZED | REVIEWED | BY  | METHOD                         |  |
| Duplicate (N808085-01) |         | N808085-06    | 7492-006 | GAM    |      | 08/27/98 | 09/09/98 | NJV | Gamma Scan in Liquid           |  |
| 200 West               | LIQUID  | 08/10/98      | 7492-006 | PU     |      | 08/27/98 | 09/09/98 | NJV | Plutonium-238,239/240, Liquid  |  |
|                        | B98-060 | 08/18/98      | 7492-006 | SR     |      | 08/27/98 | 09/09/98 | NJV | Strontium-90 in Liquid         |  |
|                        |         |               | 7492-006 | TP     |      | 09/02/98 | 09/09/98 | NJV | Americium 241/Curium in Liquid |  |
| Duplicate (N808085-02) |         | N808085-07    | 7492-007 | 80A/80 |      | 08/26/98 | 09/09/98 | NJV | Gross Alpha in Liquid Samples  |  |
| 200 West               | LIQUID  | 08/10/98      | 7492-007 | 80B/80 |      | 08/26/98 | 09/09/98 | NJV | Gross Beta in Liquid Samples   |  |
|                        | B98-060 | 08/18/98      | 7492-007 | NP     |      | 09/07/98 | 09/09/98 | NJV | Neptunium in liquids           |  |

## COUNTS OF TESTS BY SAMPLE TYPE

| TEST   | SAF No  | METHOD                         | REFERENCE  | CLIENT | MORE | RE | BLANK | LCS | DUP SPIKE | TOTAL |
|--------|---------|--------------------------------|------------|--------|------|----|-------|-----|-----------|-------|
| 80A/80 | B98-060 | Gross Alpha in Liquid Samples  | EPA900.0   | 3      |      |    | 1     | 1   | 1         | 6     |
| 80B/80 | B98-060 | Gross Beta in Liquid Samples   | EPA900.0   | 3      |      |    | 1     | 1   | 1         | 6     |
| GAM    | B98-060 | Gamma Scan in Liquid           | GAMMAHI    | 3      |      |    | 1     | 1   | 1         | 6     |
| NP     | B98-060 | Neptunium in liquids           | NP237PLATE | 3      |      |    | 1     | 1   | 1         | 6     |
| PU     | B98-060 | Plutonium-238,239/240, Liquid  | PUPLATE    | 3      |      |    | 1     | 1   | 1         | 6     |
| SR     | B98-060 | Strontium-90 in Liquid         | SR90       | 3      |      |    | 1     | 1   | 1         | 6     |
| TP     | B98-060 | Americium 241/Curium in Liquid |            | 3      |      |    | 1     | 1   | 1         | 6     |
| TOTALS |         |                                |            | 21     |      |    | 7     | 7   | 7         | 42    |

WORK SUMMARY

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SUMMARY DATA SECTION

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Lab id TMANC

Protocol Hanford

Version Ver 1.0

Form DVD-CWS

Version 3.06

Report date 10/10/98

**TMA / RICHMOND**  
**SAMPLE DELIVERY GROUP H0198**

N808085-05

Method Blank

**METHOD BLANK**

|                                   |                                      |                  |
|-----------------------------------|--------------------------------------|------------------|
| SDG <u>7492</u>                   | Client/Case no <u>Hanford</u>        | SDG <u>H0198</u> |
| Contact <u>N. Joseph Verville</u> | Case no <u>TRB-SBB-207925</u>        |                  |
| Lab sample id <u>N808085-05</u>   | Client sample id <u>Method Blank</u> |                  |
| Dept sample id <u>7492-005</u>    | Material/Matrix <u>LIQUID</u>        |                  |
|                                   | SAF No <u>B98-060</u>                |                  |

| ANALYTE             | CAS NO     | RESULT<br>pCi/L | 2σ ERR<br>(COUNT) | MDA<br>pCi/L | RDL<br>pCi/L | QUALI-<br>FIERS | TEST |
|---------------------|------------|-----------------|-------------------|--------------|--------------|-----------------|------|
| Gross Alpha         | 12587-46-1 | -0.21           | 1.2               | 2.9          | 3.0          | U               | 80A  |
| Gross Beta          | 12587-47-2 | -1.9            | 3.4               | 6.2          | 4.0          | U               | 80B  |
| Curium 244          | 13981-15-2 | 0               | 0.056             | 0.14         |              | U               | TP   |
| Plutonium 238       | 13981-16-3 | 0.090           | 0.078             | 0.099        | 1.0          | U               | PU   |
| Plutonium 239/240   | 15117-48-3 | 0.13            | 0.078             | 0.099        | 1.0          | J               | PU   |
| Americium 241       | 14596-10-2 | 0.028           | 0.085             | 0.11         |              | U               | TP   |
| Strontium 90        | SR-90      | -0.64           | 1.8               | 2.3          | 2.0          | U               | SR   |
| Neptunium 237       | NP237PLATE | 0.077           | 0.077             | 0.15         |              | U               | NP   |
| GAMMA SCAN ANALYTES |            | U               |                   |              |              |                 |      |
| Potassium 40        | 13966-00-2 | U               |                   | 220          |              | U               | GAM  |
| Cobalt 60           | 10198-40-0 | U               |                   | 15           | 25           | U               | GAM  |
| Cesium 137          | 10045-97-3 | U               |                   | 13           | 15           | U               | GAM  |
| Europium 152        | 14683-23-9 | U               |                   | 36           | 50           | U               | GAM  |
| Europium 154        | 15585-10-1 | U               |                   | 40           | 50           | U               | GAM  |
| Europium 155        | 14391-16-3 | U               |                   | 33           | 50           | U               | GAM  |
| Americium 241       | 14596-10-2 | U               |                   | 41           |              | U               | GAM  |
| Uranium 238         | U-238      | U               |                   | 1700         |              | U               | GAM  |
| Uranium 235         | U-235      | U               |                   | 48           |              | U               | GAM  |

202-S Bldg-Pu Loadout Hood-Other Liq

QC-BLANK 28921

## TMA/RICHMOND

SAMPLE DELIVERY GROUP H0198

N808085-04

Lab Control Sample

## LAB CONTROL SAMPLE

SDG 7492

Client/Case no Hanford

SDG H0198

Contact N. Joseph Verville

Case no TRB-SBB-207925

Lab sample id N808085-04

Client sample id Lab Control Sample

Dept sample id 7492-004

Material/Matrix LIQUID

SAF No B98-060

| ANALYTE               | RESULT<br>pCi/L | 2 $\sigma$ ERR<br>(COUNT) | MDA<br>pCi/L | RDL<br>pCi/L | QUALI-<br>FIERS | TEST | ADDED<br>pCi/L | 2 $\sigma$ ERR<br>pCi/L | REC<br>% | 3 $\sigma$ LMES<br>(TOTAL) | PROTOCOL<br>LIMITS |
|-----------------------|-----------------|---------------------------|--------------|--------------|-----------------|------|----------------|-------------------------|----------|----------------------------|--------------------|
| Gross Alpha           | 190             | 7.3                       | 1.5          | 3.0          |                 | 80A  | 192            | 7.7                     | 99       | 69-131                     | 80-120             |
| Gross Beta            | 210             | 5.6                       | 3.8          | 4.0          |                 | 80B  | 224            | 9.0                     | 94       | 78-122                     | 80-120             |
| Curium 244            | 51              | 3.0                       | 0.10         |              |                 | TP   | 55.6           | 2.2                     | 92       | 88-112                     |                    |
| Plutonium 238         | 46              | 2.9                       | 0.099        | 1.0          |                 | PU   | 50.6           | 2.0                     | 91       | 87-113                     | 80-120             |
| Plutonium 239/240     | 49              | 3.1                       | 0.12         | 1.0          | B               | PU   | 53.0           | 2.1                     | 92       | 87-113                     | 80-120             |
| Americium 241         | 45              | 2.7                       | 0.13         |              |                 | TP   | 48.0           | 1.9                     | 94       | 87-113                     |                    |
| Strontium 90          | 110             | 5.2                       | 2.6          | 2.0          |                 | SR   | 108            | 4.3                     | 102      | 81-119                     |                    |
| Neptunium 237         | 52              | 2.0                       | 0.099        |              |                 | NP   | 52.9           | 2.1                     | 98       | 89-111                     |                    |
| GAMMA SCAN ANALYTES U |                 |                           |              |              |                 |      |                |                         |          |                            |                    |
| Cobalt 60             | 540             | 44                        | 22           | 25           |                 | GAM  | 498            | 20                      | 108      | 78-122                     | 80-120             |
| Cesium 137            | 660             | 41                        | 29           | 15           |                 | GAM  | 582            | 23                      | 113      | 79-121                     | 80-120             |

202-S Bldg-Pu Loadout Hood-Other Liq

QC-LCS 28920

LAB CONTROL SAMPLES

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SUMMARY DATA SECTION

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Lab id TMANC

Protocol Hanford

Version Ver 2.0

Form DVD-LCS

Version 3.06

Report date 10/10/98

## TMA/RICHMOND

SAMPLE DELIVERY GROUP H0198

N808085-06

B0PPC1

## DUPLICATE

SDG 7492

Contact N. Joseph Verville

DUPLICATE

Client/Case no Hanford SDG H0198Case no TRB-SBB-207925

ORIGINAL

Lab sample id N808085-06Lab sample id N808085-01Client sample id B0PPC1Dept sample id 7492-006Dept sample id 7492-001Location/Matrix 200 West LIQUIDReceived 08/18/98Collected 08/10/98 15:00Custody/SAF No B98-060-09 B98-060

| ANALYTE             | DUPLICATE<br>pCi/L | 2σ ERR<br>(COUNT) | MDA<br>pCi/L | RDL<br>pCi/L | QUALI-<br>FIERS | TEST | ORIGINAL<br>pCi/L | 2σ ERR<br>(COUNT) | MDA<br>pCi/L | QUALI-<br>FIERS | RPD<br>% | 3σ<br>TOT | PROT<br>LIMIT |
|---------------------|--------------------|-------------------|--------------|--------------|-----------------|------|-------------------|-------------------|--------------|-----------------|----------|-----------|---------------|
| Curium 244          | 0.21               | 0.12              | 0.12         |              |                 | TP   | 0                 | 0.080             | 0.15         | U               | 200      | 207       |               |
| Plutonium 238       | 0                  | 0.025             | 0.095        | 1.0          | U               | PU   | 0.14              | 0.14              | 0.25         | U               | -        |           |               |
| Plutonium 239/240   | -0.025             | 0.025             | 0.12         | 1.0          | U               | PU   | 0                 | 0.11              | 0.22         | U               | -        |           |               |
| Americium 241       | 0.20               | 0.12              | 0.12         |              |                 | TP   | 0.027             | 0.080             | 0.10         | U               | 152      | 191       |               |
| Strontium 90        | 0.095              | 1.8               | 2.2          | 2.0          | U               | SR   | 0.58              | 1.8               | 2.2          | U               | -        |           |               |
| GAMMA SCAN ANALYTES | U                  |                   |              |              |                 |      | U                 |                   |              |                 |          |           |               |
| Potassium 40        | U                  |                   | 81           |              | UX              | GAM  | U                 |                   | 180          | U               | -        |           |               |
| Cobalt 60           | U                  |                   | 5.9          | 25           | UX              | GAM  | U                 |                   | 19           | U               | -        |           |               |
| Cesium 137          | U                  |                   | 5.5          | 15           | UX              | GAM  | U                 |                   | 16           | U               | -        |           |               |
| Europium 152        | U                  |                   | 16           | 50           | UX              | GAM  | U                 |                   | 45           | U               | -        |           |               |
| Europium 154        | U                  |                   | 21           | 50           | UX              | GAM  | U                 |                   | 56           | U               | -        |           |               |
| Europium 155        | U                  |                   | 15           | 50           | UX              | GAM  | U                 |                   | 27           | U               | -        |           |               |
| Americium 241       | U                  |                   | 16           |              | UX              | GAM  | U                 |                   | 17           | U               | -        |           |               |
| Uranium 238         | U                  |                   | 720          |              | UX              | GAM  | U                 |                   | 2300         | U               | -        |           |               |
| Uranium 235         | U                  |                   | 22           |              | UX              | GAM  | U                 |                   | 51           | U               | -        |           |               |

202-S Bldg-Pu Loadout Hood-Other Liq

QC-DUP#1 28922

## DUPLICATES

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## SUMMARY DATA SECTION

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Lab id TMANCProtocol HanfordVersion Ver 1.0Form DVD-DUPVersion 3.06Report date 10/10/98

## TMA/RICHMOND

SAMPLE DELIVERY GROUP H0198

N808085-07

B0PPC2

## DUPLICATE

SDG 7492Contact N. Joseph Verville

DUPLICATE

Lab sample id N808085-07Dept sample id 7492-007

ORIGINAL

Lab sample id N808085-02Dept sample id 7492-002Received 08/18/98Client/Case no Hanford SDG H0198Case no TRB-SBB-207925Client sample id B0PPC2Location/Matrix 200 West LIQUIDCollected 08/10/98 15:05Custody/SAF No B98-060-03 B98-060

| ANALYTE       | DUPLICATE<br>pCi/L | 2σ ERR<br>(COUNT) | MDA<br>pCi/L | RDL<br>pCi/L | QUALI-<br>FIERS | TEST | ORIGINAL<br>pCi/L | 2σ ERR<br>(COUNT) | MDA<br>pCi/L | QUALI-<br>FIERS | RPD<br>% | 3σ PROT<br>TOT LIMIT |
|---------------|--------------------|-------------------|--------------|--------------|-----------------|------|-------------------|-------------------|--------------|-----------------|----------|----------------------|
| Gross Alpha   | -0.31              | 0.97              | 2.4          | 3.0          | U               | 80A  | 0.41              | 1.2               | 2.2          | U               | -        |                      |
| Gross Beta    | -2.6               | 3.6               | <u>6.4</u>   | 4.0          | U               | 80B  | -0.071            | 3.3               | <u>5.6</u>   | U               | -        |                      |
| Neptunium 237 | 0                  | 0.044             | 0.11         |              | U               | NP   | 0.040             | 0.081             | 0.14         | U               | -        |                      |

202-S Bldg-Pu Loadout Hood-Other Liq

QC-DUP#2 28990

DUPLICATES

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SUMMARY DATA SECTION

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Lab id TMANCProtocol HanfordVersion Ver 1.0Form DVD-DUPVersion 3.06Report date 10/10/98

**TMA / RICHMOND**  
SAMPLE DELIVERY GROUP H0198

N808085-01

B0PPC1

**DATA SHEET**

|                                   |                                  |                  |
|-----------------------------------|----------------------------------|------------------|
| SDG <u>7492</u>                   | Client/Case no <u>Hanford</u>    | SDG <u>H0198</u> |
| Contact <u>N. Joseph Verville</u> | Case no <u>TRB-SBB-207925</u>    |                  |
| Lab sample id <u>N808085-01</u>   | Client sample id <u>B0PPC1</u>   |                  |
| Dept sample id <u>7492-001</u>    | Location/Matrix <u>200 West</u>  | <u>LIQUID</u>    |
| Received <u>08/18/98</u>          | Collected <u>08/10/98 15:00</u>  |                  |
|                                   | Custody/SAF No <u>B98-060-09</u> | <u>B98-060</u>   |

| ANALYTE             | CAS NO     | RESULT<br>pCi/L | 2σ ERR<br>(COUNT) | MDA<br>pCi/L | RDL<br>pCi/L | QUALI-<br>FIERS | TEST |
|---------------------|------------|-----------------|-------------------|--------------|--------------|-----------------|------|
| Gross Alpha         | 12587-46-1 | -0.30           | 0.53              | 1.1          | 3.0          | U               | 80A  |
| Gross Beta          | 12587-47-2 | -1.0            | 1.7               | 2.8          | 4.0          | U               | 80B  |
| Curium 244          | 13981-15-2 | 0               | 0.080             | 0.15         |              | U               | TP   |
| Plutonium 238       | 13981-16-3 | 0.14            | 0.14              | 0.25         | 1.0          | U               | PU   |
| Plutonium 239/240   | 15117-48-3 | 0               | 0.11              | 0.22         | 1.0          | U               | PU   |
| Americium 241       | 14596-10-2 | 0.027           | 0.080             | 0.10         |              | U               | TP   |
| Strontium 90        | SR-90      | 0.58            | 1.8               | <u>2.2</u>   | 2.0          | U               | SR   |
| Neptunium 237       | NP237PLATE | -0.012          | 0.069             | 0.17         |              | U               | NP   |
| GAMMA SCAN ANALYTES |            | U               |                   |              |              |                 |      |
| Potassium 40        | 13966-00-2 | U               |                   | 180          |              | U               | GAM  |
| Cobalt 60           | 10198-40-0 | U               |                   | 19           | 25           | U               | GAM  |
| Cesium 137          | 10045-97-3 | U               |                   | <u>16</u>    | 15           | U               | GAM  |
| Europium 152        | 14683-23-9 | U               |                   | 45           | 50           | U               | GAM  |
| Europium 154        | 15585-10-1 | U               |                   | <u>56</u>    | 50           | U               | GAM  |
| Europium 155        | 14391-16-3 | U               |                   | 27           | 50           | U               | GAM  |
| Americium 241       | 14596-10-2 | U               |                   | 17           |              | U               | GAM  |
| Uranium 238         | U-238      | U               |                   | 2300         |              | U               | GAM  |
| Uranium 235         | U-235      | U               |                   | 51           |              | U               | GAM  |

202-S Bldg-Pu Loadout Hood-Other Liq

**TMA / RICHMOND**  
**SAMPLE DELIVERY GROUP H0198**

**N808085-02**

**B0PPC2**

**DATA SHEET**

|                                   |                                  |                  |
|-----------------------------------|----------------------------------|------------------|
| SDG <u>7492</u>                   | Client/Case no <u>Hanford</u>    | SDG <u>H0198</u> |
| Contact <u>N. Joseph Verville</u> | Case no <u>TRB-SBB-207925</u>    |                  |
| Lab sample id <u>N808085-02</u>   | Client sample id <u>B0PPC2</u>   |                  |
| Dept sample id <u>7492-002</u>    | Location/Matrix <u>200 West</u>  | <u>LIQUID</u>    |
| Received <u>08/18/98</u>          | Collected <u>08/10/98 15:05</u>  |                  |
|                                   | Custody/SAF No <u>B98-060-09</u> | <u>B98-060</u>   |

| ANALYTE             | CAS NO     | RESULT<br>pCi/L | 2σ ERR<br>(COUNT) | MDA<br>pCi/L | RDL<br>pCi/L | QUALI-<br>FIERS | TEST |
|---------------------|------------|-----------------|-------------------|--------------|--------------|-----------------|------|
| Gross Alpha         | 12587-46-1 | 0.41            | 1.2               | 2.2          | 3.0          | U               | 80A  |
| Gross Beta          | 12587-47-2 | -0.071          | 3.3               | <u>5.6</u>   | 4.0          | U               | 80B  |
| Curium 244          | 13981-15-2 | 0.10            | 0.089             | 0.11         |              | U               | TP   |
| Plutonium 238       | 13981-16-3 | 0.039           | 0.078             | 0.15         | 1.0          | U               | PU   |
| Plutonium 239/240   | 15117-48-3 | 0.020           | 0.078             | 0.15         | 1.0          | U               | PU   |
| Americium 241       | 14596-10-2 | 0.015           | 0.059             | 0.11         |              | U               | TP   |
| Strontium 90        | SR-90      | 0.20            | 1.6               | 2.0          | 2.0          | U               | SR   |
| Neptunium 237       | NP237PLATE | 0.040           | 0.081             | 0.14         |              | U               | NP   |
| GAMMA SCAN ANALYTES |            | U               |                   |              |              |                 |      |
| Potassium 40        | 13966-00-2 | U               |                   | 230          |              | U               | GAM  |
| Cobalt 60           | 10198-40-0 | U               |                   | 18           | 25           | U               | GAM  |
| Cesium 137          | 10045-97-3 | U               |                   | <u>16</u>    | 15           | U               | GAM  |
| Europium 152        | 14683-23-9 | U               |                   | 38           | 50           | U               | GAM  |
| Europium 154        | 15585-10-1 | U               |                   | <u>54</u>    | 50           | U               | GAM  |
| Europium 155        | 14391-16-3 | U               |                   | 36           | 50           | U               | GAM  |
| Americium 241       | 14596-10-2 | U               |                   | 45           |              | U               | GAM  |
| Uranium 238         | U-238      | U               |                   | 1800         |              | U               | GAM  |
| Uranium 235         | U-235      | U               |                   | 54           |              | U               | GAM  |

202-S Bldg-Pu Loadout Hood-Other Liq

**TMA / RICHMOND**  
SAMPLE DELIVERY GROUP H0198

**N808085-03**

**B0PPC3**

**DATA SHEET**

|                                   |                                  |                  |
|-----------------------------------|----------------------------------|------------------|
| SDG <u>7492</u>                   | Client/Case no <u>Hanford</u>    | SDG <u>H0198</u> |
| Contact <u>N. Joseph Verville</u> | Case no <u>TRB-SBB-207925</u>    |                  |
| Lab sample id <u>N808085-03</u>   | Client sample id <u>B0PPC3</u>   |                  |
| Dept sample id <u>7492-003</u>    | Location/Matrix <u>200 West</u>  | <u>LIQUID</u>    |
| Received <u>08/18/98</u>          | Collected <u>08/10/98 15:20</u>  |                  |
|                                   | Custody/SAF No <u>B98-060-09</u> | <u>B98-060</u>   |

| ANALYTE             | CAS NO     | RESULT<br>pCi/L | 2σ ERR<br>(COUNT) | MDA<br>pCi/L | RDL<br>pCi/L | QUALI-<br>FIERS | TEST |
|---------------------|------------|-----------------|-------------------|--------------|--------------|-----------------|------|
| Gross Alpha         | 12587-46-1 | -0.44           | 0.64              | 1.3          | 3.0          | U               | 80A  |
| Gross Beta          | 12587-47-2 | -0.89           | 1.6               | 2.8          | 4.0          | U               | 80B  |
| Curium 244          | 13981-15-2 | 0.013           | 0.053             | 0.10         |              | U               | TP   |
| Plutonium 238       | 13981-16-3 | -0.013          | 0.077             | 0.16         | 1.0          | U               | PU   |
| Plutonium 239/240   | 15117-48-3 | -0.013          | 0.077             | 0.16         | 1.0          | U               | PU   |
| Americium 241       | 14596-10-2 | -0.013          | 0.052             | 0.10         |              | U               | TP   |
| Strontium 90        | SR-90      | -0.92           | 2.0               | <u>2.5</u>   | 2.0          | U               | SR   |
| Neptunium 237       | NP237PLATE | 0.058           | <u>0.077</u>      | 0.058        |              |                 | NP   |
| GAMMA SCAN ANALYTES |            | U               |                   |              |              |                 |      |
| Potassium 40        | 13966-00-2 | U               |                   | 170          |              | U               | GAM  |
| Cobalt 60           | 10198-40-0 | U               |                   | 7.6          | 25           | U               | GAM  |
| Cesium 137          | 10045-97-3 | U               |                   | 6.0          | 15           | U               | GAM  |
| Europium 152        | 14683-23-9 | U               |                   | 18           | 50           | U               | GAM  |
| Europium 154        | 15585-10-1 | U               |                   | 20           | 50           | U               | GAM  |
| Europium 155        | 14391-16-3 | U               |                   | 17           | 50           | U               | GAM  |
| Americium 241       | 14596-10-2 | U               |                   | 17           |              | U               | GAM  |
| Uranium 238         | U-238      | U               |                   | 850          |              | U               | GAM  |
| Uranium 235         | U-235      | U               |                   | 24           |              | U               | GAM  |

202-S Bldg-Pu Loadout Hood-Other Liq

**DATA SHEETS**  
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**SUMMARY DATA SECTION**  
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Lab id TMANC  
Protocol Hanford  
Version Ver 1.0  
Form DVD-DS  
Version 3.06  
Report date 10/10/98

## TMA/RICHMOND

SAMPLE DELIVERY GROUP H0198

Test NP Matrix LIQUID  
SDG 7492  
Contact N. Joseph Verville

## METHOD SUMMARY

NEPTUNIUM IN LIQUIDS  
ALPHA SPECTROSCOPY

Client Hanford  
Contract TRB-SBB-207925  
Case no SDG H0198

## RESULTS

| CLIENT SAMPLE ID | LAB<br>SAMPLE ID | RAW SUP-<br>TEST FIX | PLANCHET | Neptunium<br>237 |
|------------------|------------------|----------------------|----------|------------------|
|------------------|------------------|----------------------|----------|------------------|

## Preparation batch 2785-118

|                        |            |          |       |
|------------------------|------------|----------|-------|
| BOPPC1                 | N808085-01 | 7492-001 | U     |
| BOPPC2                 | N808085-02 | 7492-002 | U     |
| BOPPC3                 | N808085-03 | 7492-003 | 0.058 |
| BLK (QC ID=28921)      | N808085-05 | 7492-005 | U     |
| LCS (QC ID=28920)      | N808085-04 | 7492-004 | ok    |
| Duplicate (N808085-02) | N808085-07 | 7492-007 | - U   |

Nominal values and limits from method RDLs (pCi/L)  
202-S Bldg-Pu Loadout Hood-Other Liq

## METHOD PERFORMANCE

| CLIENT SAMPLE ID | LAB<br>SAMPLE ID | RAW SUP-<br>TEST FIX | MDA<br>pCi/L | ALIQ<br>L | PREP<br>FAC | DILU-<br>TION | YIELD<br>% | EFF<br>% | COUNT<br>min | FWHM<br>keV | DRIFT<br>KeV | DAYS<br>HELD | ANAL-<br>PREPARED | YZED | DETECTOR |
|------------------|------------------|----------------------|--------------|-----------|-------------|---------------|------------|----------|--------------|-------------|--------------|--------------|-------------------|------|----------|
|------------------|------------------|----------------------|--------------|-----------|-------------|---------------|------------|----------|--------------|-------------|--------------|--------------|-------------------|------|----------|

## Preparation batch 2785-118 2σ prep error 5.0 % Reference Lab Notebook #2785 pg. 118

|   |            |       |       |    |      |    |          |       |        |
|---|------------|-------|-------|----|------|----|----------|-------|--------|
| BOPPC1                                  | N808085-01 | 0.17  | 0.100 | 58 | 1812 | 28 | 09/04/98 | 09/07 | SS-009 |
| BOPPC2                                  | N808085-02 | 0.14  | 0.100 | 64 | 1812 | 28 | 09/04/98 | 09/07 | SS-010 |
| BOPPC3                                  | N808085-03 | 0.058 | 0.100 | 35 | 1812 | 28 | 09/04/98 | 09/07 | SS-011 |
| BLK (QC ID=28921)                       | N808085-05 | 0.15  | 0.100 | 34 | 1812 |    | 09/04/98 | 09/07 | SS-013 |
| LCS (QC ID=28920)                       | N808085-04 | 0.099 | 0.100 | 51 | 1812 |    | 09/04/98 | 09/07 | SS-012 |
| Duplicate (N808085-02)<br>(QC ID=28922) | N808085-07 | 0.11  | 0.100 | 58 | 1812 | 28 | 09/04/98 | 09/07 | SS-014 |

Nominal values and limits from method 0.100 20-105 100

PROCEDURES REFERENCE NP237PLATE  
EP-930 Neptunium Purification, rev 0

AVERAGES ± 2 SD MDA 0.12 ± 0.081  
FOR 6 SAMPLES YIELD 50 ± 25

## METHOD SUMMARIES

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## SUMMARY DATA SECTION

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Lab id TMANC  
Protocol Hanford  
Version Ver 1.0  
Form DVD-CMS  
Version 3.06  
Report date 10/10/98

# TMA/RICHMOND

SAMPLE DELIVERY GROUP H0198

Test PU Matrix LIQUID  
SDG 7492  
Contact N. Joseph Verville

## METHOD SUMMARY

PLUTONIUM-238,239/240, LIQUID  
ALPHA SPECTROSCOPY

Client Hanford  
Contract TRB-SBB-207925  
Case no SDG H0198

## RESULTS

| CLIENT SAMPLE ID           | LAB<br>SAMPLE ID | RAW<br>TEST | SUF-<br>FIX | Plutonium<br>PLANCHET | Plutonium<br>238 | Plutonium<br>239/240 |
|----------------------------|------------------|-------------|-------------|-----------------------|------------------|----------------------|
| Preparation batch 2785-118 |                  |             |             |                       |                  |                      |
| BOPPC1                     | N808085-01       |             |             | 7492-001              | U                | U                    |
| BOPPC2                     | N808085-02       |             |             | 7492-002              | U                | U                    |
| BOPPC3                     | N808085-03       |             |             | 7492-003              | U                | U                    |
| BLK (QC ID=28921)          | N808085-05       |             |             | 7492-005              | U                | 0.13 J               |
| LCS (QC ID=28920)          | N808085-04       |             |             | 7492-004              | ok               | ok                   |
| Duplicate (N808085-01)     | N808085-06       |             |             | 7492-006              | - U              | - U                  |

Nominal values and limits from method RDLs (pCi/L) 1.0 1.0  
202-S Bldg-Pu Loadout Hood-Other Liq

## METHOD PERFORMANCE

| CLIENT SAMPLE ID  | LAB<br>SAMPLE ID | RAW<br>TEST | SUF-<br>FIX | MAX MDA<br>pCi/L | ALIQ<br>L | PREP<br>FAC | DILU-<br>TION | YIELD<br>% | EFF<br>% | COUNT<br>min | FWHM<br>keV | DRIFT<br>KeV | DAYS<br>HELD | ANAL-<br>PREPARED | YZED  | DETECTOR |
|---|------------------|-------------|-------------|------------------|-----------|-------------|---------------|------------|----------|--------------|-------------|--------------|--------------|-------------------|-------|----------|
| Preparation batch 2785-118 2σ prep error 5.0 % Reference Lab Notebook #2785 pg. 118 |                  |             |             |                  |           |             |               |            |          |              |             |              |              |                   |       |          |
| BOPPC1  | N808085-01       |             |             | 0.25             | 0.100     |             |               | 62         |          | 1086         |             |              | 17           | 08/27/98          | 08/27 | SS-009   |
| BOPPC2  | N808085-02       |             |             | 0.15             | 0.100     |             |               | 54         |          | 1086         |             |              | 17           | 08/27/98          | 08/27 | SS-010   |
| BOPPC3  | N808085-03       |             |             | 0.16             | 0.100     |             |               | 86         |          | 1086         |             |              | 17           | 08/27/98          | 08/27 | SS-011   |
| BLK (QC ID=28921)   | N808085-05       |             |             | 0.099            | 0.100     |             |               | 85         |          | 1086         |             |              |              | 08/27/98          | 08/27 | SS-015   |
| LCS (QC ID=28920)   | N808085-04       |             |             | 0.12             | 0.100     |             |               | 83         |          | 1086         |             |              |              | 08/27/98          | 08/27 | SS-012   |
| Duplicate (N808085-01)<br>(QC ID=28922)   | N808085-06       |             |             | 0.12             | 0.100     |             |               | 88         |          | 1086         |             |              | 17           | 08/27/98          | 08/27 | SS-016   |

Nominal values and limits from method 1.0 1.00 700 180

PROCEDURES REFERENCE PUPLATE  
RP-070 Sample Dissolution - HF Method, rev 0  
RP-941 Plutonium Purification - Small Aliquot, rev 0

AVERAGES ± 2 SD MDA 0.15 ± 0.11  
FOR 6 SAMPLES YIELD 76 ± 29

### METHOD SUMMARIES

Page 2

### SUMMARY DATA SECTION

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Lab id TMANC  
Protocol Hanford  
Version Ver 1.0  
Form DVD-CMS  
Version 3.06  
Report date 10/10/98

## TMA/RICHMOND

SAMPLE DELIVERY GROUP H0198

Test TP Matrix LIQUID  
SDG 7492  
Contact N. Joseph Verville

## METHOD SUMMARY

AMERICIUM 241/CURIUM IN LIQUID  
ALPHA SPECTROSCOPY

Client Hanford  
Contract TRB-SBB-207925  
Case no SDG H0198

## RESULTS

| CLIENT SAMPLE ID           | LAB<br>SAMPLE ID | RAW<br>TEST FIX | SUF-<br>PLANCHET | Americium<br>Curium 244 | 241 |
|----------------------------|------------------|-----------------|------------------|-------------------------|-----|
| Preparation batch 2785-118 |                  |                 |                  |                         |     |
| B0PPC1                     | N808085-01       |                 | 7492-001         | U                       | U   |
| B0PPC2                     | N808085-02       |                 | 7492-002         | U                       | U   |
| B0PPC3                     | N808085-03       |                 | 7492-003         | U                       | U   |
| BLK (QC ID=28921)          | N808085-05       |                 | 7492-005         | U                       | U   |
| LCS (QC ID=28920)          | N808085-04       |                 | 7492-004         | ok                      | ok  |
| Duplicate (N808085-01)     | N808085-06       |                 | 7492-006         | ok                      | ok  |

Nominal values and limits from method RDLs (pCi/L)  
202-S Bldg-Pu Loadout Hood-Other Liq

## METHOD PERFORMANCE

| CLIENT SAMPLE ID  | LAB<br>SAMPLE ID | RAW<br>TEST FIX | SUF-<br>pCi/L | MAX MDA<br>L | ALIQ<br>L | PREP<br>FAC | DILU-<br>TION | YIELD<br>% | EFF<br>% | COUNT<br>min | FWHM<br>keV | DRIFT<br>KeV | DAYS<br>HELD | ANAL-<br>PREPARED | YZED   | DETECTOR |
|---|------------------|-----------------|---------------|--------------|-----------|-------------|---------------|------------|----------|--------------|-------------|--------------|--------------|-------------------|--------|----------|
| Preparation batch 2785-118 2σ prep error 5.0 % Reference Lab Notebook #2785 pg. 118 |                  |                 |               |              |           |             |               |            |          |              |             |              |              |                   |        |          |
| B0PPC1  | N808085-01       |                 | 0.15          | 0.100        |           |             |               | 81         |          | 1080         |             | 23           | 09/02/98     | 09/02             | SS-056 |          |
| B0PPC2  | N808085-02       |                 | 0.11          | 0.100        |           |             |               | 74         |          | 1080         |             | 23           | 09/02/98     | 09/02             | SS-058 |          |
| B0PPC3  | N808085-03       |                 | 0.10          | 0.100        |           |             |               | 82         |          | 1080         |             | 23           | 09/02/98     | 09/02             | SS-059 |          |
| BLK (QC ID=28921)   | N808085-05       |                 | 0.14          | 0.100        |           |             |               | 76         |          | 1080         |             |              | 09/02/98     | 09/02             | SS-065 |          |
| LCS (QC ID=28920)   | N808085-04       |                 | 0.13          | 0.100        |           |             |               | 82         |          | 1080         |             |              | 09/02/98     | 09/02             | SS-062 |          |
| Duplicate (N808085-01)  | N808085-06       |                 | 0.12          | 0.100        |           |             |               | 71         |          | 1080         |             | 23           | 09/02/98     | 09/02             | SS-066 |          |
| (QC ID=28922)   |                  |                 |               |              |           |             |               |            |          |              |             |              |              |                   |        |          |
| Nominal values and limits from method 0.100 20-105 700 100                          |                  |                 |               |              |           |             |               |            |          |              |             |              |              |                   |        |          |

PROCEDURES RP-070 Sample Dissolution - HF Method, rev 0  
RP-941 Plutonium Purification - Small Aliquot, rev 0  
RP-961 Americium-Curium Purification - Small Aliquot, rev 0

AVERAGES ± 2 SD MDA 0.12 ± 0.037  
FOR 6 SAMPLES YIELD 78 ± 9

## METHOD SUMMARIES

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## SUMMARY DATA SECTION

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Lab id TMANC  
Protocol Hanford  
Version Ver 1.0  
Form DVD-CMS  
Version 3.06  
Report date 10/10/98

## TMA/RICHMOND

SAMPLE DELIVERY GROUP H0198

Test SR Matrix LIQUIDSDG 7492Contact N. Joseph Verville

## METHOD SUMMARY

STRONTIUM-90 IN LIQUID

BETA COUNTING

Client HanfordContract TRB-SBB-207925Case no SDG H0198

## RESULTS

| CLIENT SAMPLE ID | LAB<br>SAMPLE ID | RAW<br>TEST FIX | SUF-<br>PLANCHET | Strontium 90 |
|------------------|------------------|-----------------|------------------|--------------|
|------------------|------------------|-----------------|------------------|--------------|

## Preparation batch 2785-118

|                        |            |          |     |
|------------------------|------------|----------|-----|
| BOPPC1                 | N808085-01 | 7492-001 | U   |
| BOPPC2                 | N808085-02 | 7492-002 | U   |
| BOPPC3                 | N808085-03 | 7492-003 | U   |
| BLK (QC ID=28921)      | N808085-05 | 7492-005 | U   |
| LCS (QC ID=28920)      | N808085-04 | 7492-004 | ok  |
| Duplicate (N808085-01) | N808085-06 | 7492-006 | - U |

Nominal values and limits from method RDLs (pCi/L) 2.0  
202-S Bldg-Pu Loadout Hood-Other Liq

## METHOD PERFORMANCE

| CLIENT SAMPLE ID | LAB<br>SAMPLE ID | RAW<br>TEST FIX | SUF-<br>pCi/L | MDA | ALIQ<br>L | PREP<br>FAC | DILU-<br>TION | YIELD<br>% | EFF<br>% | COUNT<br>min | FWHM<br>keV | DRIFT<br>KeV | DAYS<br>HELD | ANAL-<br>PREPARED | YZED | DETECTOR |
|------------------|------------------|-----------------|---------------|-----|-----------|-------------|---------------|------------|----------|--------------|-------------|--------------|--------------|-------------------|------|----------|
|------------------|------------------|-----------------|---------------|-----|-----------|-------------|---------------|------------|----------|--------------|-------------|--------------|--------------|-------------------|------|----------|

## Preparation batch 2785-118 2σ prep error 10.0 % Reference Lab Notebook #2785 pg. 118

|   |            |     |       |    |     |    |          |       |         |
|---|------------|-----|-------|----|-----|----|----------|-------|---------|
| BOPPC1                                  | N808085-01 | 2.2 | 0.100 | 81 | 400 | 17 | 08/27/98 | 08/27 | GRB-227 |
| BOPPC2                                  | N808085-02 | 2.0 | 0.100 | 86 | 400 | 17 | 08/27/98 | 08/27 | GRB-228 |
| BOPPC3                                  | N808085-03 | 2.5 | 0.100 | 76 | 400 | 17 | 08/27/98 | 08/27 | GRB-229 |
| BLK (QC ID=28921)                       | N808085-05 | 2.3 | 0.100 | 81 | 400 |    | 08/27/98 | 08/27 | GRB-231 |
| LCS (QC ID=28920)                       | N808085-04 | 2.6 | 0.100 | 79 | 200 |    | 08/27/98 | 08/27 | GRB-217 |
| Duplicate (N808085-01)<br>(QC ID=28922) | N808085-06 | 2.2 | 0.100 | 80 | 400 | 17 | 08/27/98 | 08/27 | GRB-232 |

Nominal values and limits from method 2.0 1.00 100 180

| PROCEDURES | REFERENCE  | SR90 |
|------------|--|------|
| RP-500     | Strontium - Initial Separation, rev 0                      |      |
| RP-519     | Strontium-89,90 Demounting and Yttrium Purification, rev 0 |      |

|                 |       |     |   |      |
|-----------------|-------|-----|---|------|
| AVERAGES ± 2 SD | MDA   | 2.3 | ± | 0.44 |
| FOR 6 SAMPLES   | YIELD | 80  | ± | 7    |

## METHOD SUMMARIES

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## SUMMARY DATA SECTION

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Lab id TMANCProtocol HanfordVersion Ver 1.0Form DVD-CMSVersion 3.06Report date 10/10/98

# TMA/RICHMOND

SAMPLE DELIVERY GROUP H0198

## METHOD SUMMARY

GROSS ALPHA IN LIQUID SAMPLES  
GAS PROPORTIONAL COUNTING

Test 80A Matrix LIQUID

SDG 7492

Contact N. Joseph Verville

Client Hanford

Contract TRB-SBB-207925

Case no SDG H0198

## RESULTS

| LAB                                   |            | RAW  | SUF-         | 1: Gross | 2: Sum, Alpha | RESULT RATIO (%) |           |
|---------------------------------------|------------|------|--------------|----------|---------------|------------------|-----------|
| CLIENT SAMPLE ID                      | SAMPLE ID  | TEST | FIX          | PLANCHET | Alpha         | Emitters         | 2+1    2σ |
| Preparation batch 2785-118            |            |      |              |          |               |                  |           |
| BOPPC1                                | N808085-01 | 80   |              | 7492-001 | U             |                  |           |
| BOPPC2                                | N808085-02 | 80   |              | 7492-002 | U             |                  |           |
| BOPPC3                                | N808085-03 | 80   |              | 7492-003 | U             |                  |           |
| BLK (QC ID=28921)                     | N808085-05 | 80   |              | 7492-005 | U             |                  |           |
| LCS (QC ID=28920)                     | N808085-04 | 80   |              | 7492-004 | ok            |                  |           |
| Duplicate (N808085-02)                | N808085-07 | 80   |              | 7492-007 | -             | U                |           |
| Nominal values and limits from method |            |      |              |          |               |                  |           |
|                                       |            |      | RDLs (pCi/L) | 3.0      |               |                  |           |
| 202-S Bldg-Pu Loadout Hood-Other Liq  |            |      |              |          |               | Average          |           |

## METHOD PERFORMANCE

| CLIENT SAMPLE ID  | LAB<br>SAMPLE ID | RAW<br>TEST | SUF-<br>FIX | MDA<br>pCi/L | ALIQ<br>L | PREP<br>FAC | DILU-<br>TION | RESID<br>mg | EFF<br>% | COUNT<br>min | FWHM<br>keV | DRIFT<br>KeV | DAYS<br>HELD | ANAL-<br>PREPARED | YZED    | DETECTOR |
|---|------------------|-------------|-------------|--------------|-----------|-------------|---------------|-------------|----------|--------------|-------------|--------------|--------------|-------------------|---------|----------|
| Preparation batch 2785-118      2σ prep error 20.0 %      Reference Lab      Notebook #2785 pg. 118 |                  |             |             |              |           |             |               |             |          |              |             |              |              |                   |         |          |
| BOPPC1  | N808085-01       | 80          |             | 1.1          | 0.100     |             |               | <u>1</u>    | 396      |              |             | 15           | 08/25/98     | 08/25             | GRB-113 |          |
| BOPPC2  | N808085-02       | 80          |             | 2.2          | 0.100     |             |               | <u>0</u>    | 100      |              |             | 17           | 08/25/98     | 08/27             | GRB-113 |          |
| BOPPC3  | N808085-03       | 80          |             | 1.3          | 0.100     |             |               | <u>1</u>    | 396      |              |             | 15           | 08/25/98     | 08/25             | GRB-115 |          |
| BLK (QC ID=28921)   | N808085-05       | 80          |             | 2.9          | 0.100     |             |               | 31          | 100      |              |             |              | 08/25/98     | 08/26             | GRB-111 |          |
| LCS (QC ID=28920)   | N808085-04       | 80          |             | 1.5          | 0.100     |             |               | 30          | 396      |              |             |              | 08/25/98     | 08/25             | GRB-116 |          |
| Duplicate (N808085-02)  | N808085-07       | 80          |             | 2.4          | 0.100     |             |               | <u>0</u>    | 100      |              |             | 16           | 08/25/98     | 08/26             | GRB-112 |          |
| (QC ID=28990)   |                  |             |             |              |           |             |               |             |          |              |             |              |              |                   |         |          |
| Nominal values and limits from method   |                  |             |             |              |           |             |               |             |          |              |             |              |              |                   |         |          |
|   |                  |             |             | 3.0          | 0.100     |             |               | 5-150       | 100      |              |             | 180          |              |                   |         |          |

PROCEDURES      REFERENCE      EPA900.0  
EP-120      Gross Alpha and Gross Beta in Environmental Water,  
rev 2

AVERAGES ± 2 SD      MDA 1.2 ± 1.4  
FOR 6 SAMPLES      RESIDUE 10 ± 31

### METHOD SUMMARIES

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### SUMMARY DATA SECTION

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Lab id TMANC

Protocol Hanford

Version Ver 1.0

Form DVD-CMS

Version 3.06

Report date 10/10/98

# TMA/RICHMOND

SAMPLE DELIVERY GROUP H0198

## METHOD SUMMARY

GROSS BETA IN LIQUID SAMPLES  
GAS PROPORTIONAL COUNTING

Test 80B Matrix LIQUID

SDG 7492

Contact N. Joseph Verville

Client Hanford

Contract TRB-SBB-207925

Case no SDG H0198

## RESULTS

| LAB                                   |  | RAW        |  | SUF-         |  | 1: Gross |  | 2: Sum, Beta |  | RESULT RATIO (%) |  |     |    |
|---------------------------------------|--|------------|--|--------------|--|----------|--|--------------|--|------------------|--|-----|----|
| CLIENT SAMPLE ID                      |  | SAMPLE ID  |  | TEST FIX     |  | PLANCHET |  | Beta         |  | Emitters         |  | 2+1 | 2σ |
| Preparation batch 2785-118            |  |            |  |              |  |          |  |              |  |                  |  |     |    |
| B0PPC1                                |  | N808085-01 |  | 80           |  | 7492-001 |  | U            |  |                  |  |     |    |
| B0PPC2                                |  | N808085-02 |  | 80           |  | 7492-002 |  | U            |  |                  |  |     |    |
| B0PPC3                                |  | N808085-03 |  | 80           |  | 7492-003 |  | U            |  |                  |  |     |    |
| BLK (QC ID=28921)                     |  | N808085-05 |  | 80           |  | 7492-005 |  | U            |  |                  |  |     |    |
| LCS (QC ID=28920)                     |  | N808085-04 |  | 80           |  | 7492-004 |  | ok           |  |                  |  |     |    |
| Duplicate (N808085-02)                |  | N808085-07 |  | 80           |  | 7492-007 |  | -            |  | U                |  |     |    |
| Nominal values and limits from method |  |            |  | RDLs (pCi/L) |  | 4.0      |  |              |  |                  |  |     |    |
| 202-S Bldg-Pu Loadout Hood-Other Liq  |  |            |  |              |  |          |  |              |  | Average          |  |     |    |

## METHOD PERFORMANCE

| CLIENT SAMPLE ID   | LAB<br>SAMPLE ID | RAW<br>TEST FIX | SUF-<br>pCi/L | MDA<br>ml | ALIQ<br>FAC | PREP<br>TION | DILU-<br>mg | RESID<br>% | EFF<br>min | COUNT<br>keV | FWHM<br>keV | DRIFT<br>HELD | DAYS<br>PREPARED | ANAL-<br>YZED | DETECTOR |
|--|------------------|-----------------|---------------|-----------|-------------|--------------|-------------|------------|------------|--------------|-------------|---------------|------------------|---------------|----------|
| Preparation batch 2785-118 2σ prep error 15.0 % Reference Lab Notebook #2785 pg. 118 |                  |                 |               |           |             |              |             |            |            |              |             |               |                  |               |          |
| B0PPC1   | N808085-01       | 80              | 2.8           | 0.100     |             |              | 1           | 396        | 15         | 08/25/98     | 08/25       | GRB-113       |                  |               |          |
| B0PPC2   | N808085-02       | 80              | 5.6           | 0.100     |             |              | 0           | 100        | 17         | 08/25/98     | 08/27       | GRB-113       |                  |               |          |
| B0PPC3   | N808085-03       | 80              | 2.8           | 0.100     |             |              | 1           | 396        | 15         | 08/25/98     | 08/25       | GRB-115       |                  |               |          |
| BLK (QC ID=28921)  | N808085-05       | 80              | 6.2           | 0.100     |             |              | 31          | 100        |            | 08/25/98     | 08/26       | GRB-111       |                  |               |          |
| LCS (QC ID=28920)  | N808085-04       | 80              | 3.8           | 0.100     |             |              | 30          | 396        |            | 08/25/98     | 08/25       | GRB-116       |                  |               |          |
| Duplicate (N808085-02)<br>(QC ID=28990)  | N808085-07       | 80              | 6.4           | 0.100     |             |              | 0           | 100        | 16         | 08/25/98     | 08/26       | GRB-112       |                  |               |          |
| Nominal values and limits from method  |                  |                 |               |           |             |              |             |            |            |              |             |               |                  |               |          |
|  |                  |                 | 4.0           | 0.100     |             |              | 5-150       | 100        |            | 180          |             |               |                  |               |          |

PROCEDURES REFERENCE EPA900.0  
EP-120 Gross Alpha and Gross Beta in Environmental Water,  
rev 2

AVERAGES ± 2 SD MDA 4.6 ± 3.3  
FOR 6 SAMPLES RESIDUE 10 ± 31

### METHOD SUMMARIES

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### SUMMARY DATA SECTION

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Lab id TMANC  
Protocol Hanford  
Version Ver 1.0  
Form DVD-CMS  
Version 3.06  
Report date 10/10/98

# TMA/RICHMOND

SAMPLE DELIVERY GROUP H0198

Test GAM Matrix LIQUID

SDG 7492

Contact N. Joseph Verville

## METHOD SUMMARY

GAMMA SCAN IN LIQUID

GAMMA SPECTROSCOPY

Client Hanford

Contract TRB-SBB-207925

Case no SDG H0198

## RESULTS

| CLIENT SAMPLE ID | LAB<br>SAMPLE ID | RAW<br>TEST FIX | SUF-<br>PLANCHET | Cobalt 60 | Cesium 137 |
|------------------|------------------|-----------------|------------------|-----------|------------|
|------------------|------------------|-----------------|------------------|-----------|------------|

Preparation batch 2785-118

|                        |            |          |    |    |      |
|------------------------|------------|----------|----|----|------|
| BOPPC1                 | N808085-01 | 7492-001 | U  | U  |      |
| BOPPC2                 | N808085-02 | 7492-002 | U  | U  |      |
| BOPPC3                 | N808085-03 | 7492-003 | U  | U  |      |
| BLK (QC ID=28921)      | N808085-05 | 7492-005 | U  | U  |      |
| LCS (QC ID=28920)      | N808085-04 | 7492-004 | ok | ok |      |
| Duplicate (N808085-01) | N808085-06 | 7492-006 | -  | UX | - UX |

Nominal values and limits from method RDLs (pCi/L) 25 15  
202-S Bldg-Pu Loadout Hood-Other Liq

## METHOD PERFORMANCE

| CLIENT SAMPLE ID | LAB<br>SAMPLE ID | RAW<br>TEST FIX | SUF-<br>pCi/L | MAX MDA<br>L | ALIQ<br>L | PREP<br>FAC | DILU-<br>TION | YIELD<br>% | EFF<br>% | COUNT<br>min | FWHM<br>keV | DRIFT<br>keV | DAYS<br>HELD | ANAL-<br>YZED | DETECTOR |
|------------------|------------------|-----------------|---------------|--------------|-----------|-------------|---------------|------------|----------|--------------|-------------|--------------|--------------|---------------|----------|
|------------------|------------------|-----------------|---------------|--------------|-----------|-------------|---------------|------------|----------|--------------|-------------|--------------|--------------|---------------|----------|

Preparation batch 2785-118 2σ prep error 10.0 % Reference Lab Notebook #2785 pg. 118

|                        |            |     |       |  |  |  |  |     |  |    |          |       |          |
|------------------------|------------|-----|-------|--|--|--|--|-----|--|----|----------|-------|----------|
| BOPPC1                 | N808085-01 | 16  | 0.500 |  |  |  |  | 408 |  | 16 | 08/26/98 | 08/26 | 01,01,00 |
| BOPPC2                 | N808085-02 | 16  | 0.500 |  |  |  |  | 408 |  | 16 | 08/26/98 | 08/26 | 01,03,00 |
| BOPPC3                 | N808085-03 | 6.0 | 0.500 |  |  |  |  | 408 |  | 16 | 08/26/98 | 08/26 | 01,04,00 |
| BLK (QC ID=28921)      | N808085-05 | 13  | 0.500 |  |  |  |  | 485 |  |    | 08/26/98 | 08/27 | 01,03,00 |
| LCS (QC ID=28920)      | N808085-04 | 29  | 0.500 |  |  |  |  | 420 |  |    | 08/26/98 | 08/27 | 01,01,00 |
| Duplicate (N808085-01) | N808085-06 | 5.5 | 0.500 |  |  |  |  | 485 |  | 17 | 08/26/98 | 08/27 | 01,04,00 |
| (QC ID=28922)          |            |     |       |  |  |  |  |     |  |    |          |       |          |

Nominal values and limits from method 15 0.500 5 180

| PROCEDURES | REFERENCE   | GAMMAHI |
|------------|---|---------|
| RP-070     | Sample Dissolution - HF Method, rev 0               |         |
| RP-100     | Ge(Li) Preparation for Reactor Waste Samples, rev 0 |         |

AVERAGES ± 2 SD

FOR 6 SAMPLES

MDA 14 ± 17

YIELD        ±       

## METHOD SUMMARIES

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## SUMMARY DATA SECTION

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Lab id TMANC

Protocol Hanford

Version Ver 1.0

Form DVD-CMS

Version 3.06

Report date 10/10/98

**TMA / RICHMOND**  
**SAMPLE DELIVERY GROUP H0198**

SDG 7492  
Contact N. Joseph Verville

**REPORT GUIDE**

Client Hanford  
Contract TRB-SBB-207925  
Case no SDG H0198

**SAMPLE SUMMARY**

The Sample and QC Summary Reports show all samples, including QC samples, reported in one Sample Delivery Group (SDG).

The Sample Summary Report fully identifies client samples and gives the corresponding lab sample identification. The QC Summary Report shows at the sample level how the lab organized the samples into batches and generated QC samples. The Preparation Batch and Method Summary Reports show this at the analysis level.

The following notes apply to these reports:

- \* LAB SAMPLE ID is the lab's primary identification for a sample.
- \* DEPARTMENT SAMPLE ID is an alternate lab id, for example one assigned by a radiochemistry department in a lab.
- \* CLIENT SAMPLE ID is the client's primary identification for a sample. It includes any sample preparation done by the client that is necessary to identify the sample.
- \* QC BATCH is a lab assigned code that groups samples to be processed and QCed together. These samples should have similar matrices.

QC BATCH is not necessarily the same as SDG, which reflects samples received and reported together.

- \* All Lab Control Samples, Method Blanks, Duplicates and Matrix Spikes are shown that QC any of the samples. Due to possible reanalyses, not all results for all these QC samples may be relevant to the SDG. The Lab Control Sample, Method Blank, Duplicate, Matrix Spike and Method Summary Reports detail these relationships.

**REPORT GUIDES**

Page 1

**SUMMARY DATA SECTION**

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Lab id TMANC  
Protocol Hanford  
Version Ver 1.0  
Form DVD-RG  
Version 3.06  
Report date 10/10/98

**TMA/RICHMOND**

SAMPLE DELIVERY GROUP H0198

SDG 7492  
Contact N. Joseph Verville**REPORT GUIDE**Client Hanford  
Contract TRB-SBB-207925  
Case no SDG H0198**PREPARATION BATCH SUMMARY**

The Preparation Batch Summary Report shows all preparation batches in one Sample Delivery Group (SDG) with information necessary to check the completeness and consistency of the SDG.

The following notes apply to this report:

- \* The preparation batches are shown in the same order as the Method Summary Reports are printed.
- \* Only analyses of planchets relevant to the SDG are included.
- \* Each preparation batch should have at least one Method Blank and LCS in it to validate client sample results.
- \* The QUALIFIERS shown are all qualifiers other than U, J, B, L and H that occur on any analysis in the preparation batch. The Method Summary Report has these qualifiers on a per sample basis.

These qualifiers should be reviewed as follows:

- X Some data has been manually entered or modified. Transcription errors are possible.
- P One or more results are 'preliminary'. The data is not ready for final reporting.
- 2 There were two or more results for one analyte on one planchet imported at one time. The results in DVD may not be the same as on the raw data sheets.

Other lab defined qualifiers may occur. In general, these should be addressed in the SDG narrative.

**REPORT GUIDES**

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**SUMMARY DATA SECTION**

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Protocol Hanford  
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**TMA / RICHMOND**  
**SAMPLE DELIVERY GROUP H0198**

SDG 7492  
Contact N. Joseph Verville

**REPORT GUIDE**

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**WORK SUMMARY**

The Work Summary Report shows all samples, including QC samples, and all relevant analyses in one Sample Delivery Group (SDG). This report is often useful as supporting documentation for an invoice.

The following notes apply to this report:

- \* TEST is a code for the method used to measure associated analytes. Results and related information for each analyte are on the Data Sheet Report. In special cases, a test code used in the summary data section is not the same as in associated raw data. In this case, both codes are shown on the Work Summary.
- \* SUFFIX is the lab's code to distinguish multiple analyses (recounts, reworks, reanalyses) of a fraction of the sample. The suffix indicates which result is being reported. An empty suffix normally identifies the first attempt to analyze the sample.
- \* The LAB SAMPLE ID, TEST and SUFFIX uniquely identify all supporting data for a result. The Method Summary Report for each TEST has method performance data, such as yield, for each lab sample id and suffix and procedures used in the method.
- \* PLANCHET is an alternate lab identifier for work done for one test. It, combined with the TEST and SUFFIX, may be the best link to raw data.
- \* For QC samples, only analyses that directly QC some regular sample are shown. The Lab Control Sample, Method Blank, Duplicate, Matrix Spike and Method Summary Reports detail these relationships.
- \* The SAS (Special Analytical Services) Number is a client or lab assigned code that reflects special processing for samples, such as rapid turn around. Counts of tests done are lists by SAS number since it is likely to affect prices.

**REPORT GUIDES**

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**SUMMARY DATA SECTION**

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Lab id TMANC  
Protocol Hanford  
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SDG 7492  
Contact N. Joseph Verville

**REPORT GUIDE**

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**DATA SHEET**

The Data Sheet Report shows all results and primary supporting information for one client sample or Method Blank. This report corresponds to both the CLP Inorganics and Organics Data Sheet.

The following notes apply to this report:

- \* TEST is a code for the method used to measure an analyte. If the TEST is empty, no data is available; the analyte was not analyzed for.
- \* The LAB SAMPLE ID and TEST uniquely identify work within the Summary Data Section of a Data Package. The Work Summary and Method Summary Reports further identify raw data that underlies this work.

The Method Summary Report for each TEST has method performance data, such as yield, for each Lab Sample ID and a list of procedures used in the method.

- \* ERRORS can be labeled TOTAL or COUNT. TOTAL implies a preparation (non-counting method) error has been added, as square root of sum of squares, to the counting error denoted by COUNT. The preparation errors, which may vary by preparation batch, are shown on the Method Summary Report.
- \* A RESULT can be 'N.R.' (Not Reported). This means the lab did this work but chooses not to report it now, possibly because it was reported at another time.
- \* When reporting a Method Blank, a RESULT can be 'N.A.' (Not Applicable). This means there is no reported client sample work in the same preparation batch as the Blank's result. This is likely to occur when the Method Blank is associated with reanalyses of selected work for a few samples in the SDG.

The following qualifiers are defined by the DVD system:

U The RESULT is less than the MDA (Minimum Detectable Activity).

**REPORT GUIDES**

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**SUMMARY DATA SECTION**

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Lab id TMANC  
Protocol Hanford  
Version Ver 1.0  
Form DVD-RG  
Version 3.06  
Report date 10/10/98

**TMA / RICHMOND**  
**SAMPLE DELIVERY GROUP H0198**

SDG 7492  
Contact N. Joseph Verville

**GUIDE, cont.**

Client Hanford  
Contract TRB-SBB-207925  
Case no SDG H0198

**DATA SHEET**

If the MDA is blank, the ERROR is used as the limit.

- J The RESULT is less than the RDL (Required Detection Limit) and no U qualifier is assigned.
- B A Method Blank associated with this sample had a result without a U flag and, after correcting for possibly different aliquots, that result is greater than or equal to the MDA for this sample.

Normally, B is not assigned if U is. When method blank subtraction is shown on this report, B flags are assigned based on the unsubtracted values while U's are assigned based on the subtracted ones. Both flags can be assigned in this case.

For each sample result, all Method Blank results in the same preparation batch are compared. The Method Summary Report documents this and other QC relationships.

- L Some Lab Control Sample that QC's this sample had a low recovery. The lab can disable assignment of this qualifier.
- H Similar to 'L' except the recovery was high.
- P The RESULT is 'preliminary'.
- X Some data necessary to compute the RESULT, ERROR or MDA was manually entered or modified.
- 2 There were two or more results available for this analyte. The reported result may not be the same as in the raw data.

Other qualifiers are lab defined. Definitions should be in the SDG narrative.

The following values are underlined to indicate possible problems:

- \* An MDA is underlined if it is bigger than its RDL.

**REPORT GUIDES**

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**SUMMARY DATA SECTION**

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Lab id TMANC  
Protocol Hanford  
Version Ver 1.0  
Form DVD-RG  
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TMA/RICHMOND  
SAMPLE DELIVERY GROUP H0198

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GUIDE, cont.

Client Hanford  
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DATA SHEET

- \* An ERROR is underlined if the 1.645 sigma counting error is bigger than both the MDA and the RESULT, implying that the MDA may not be a good estimate of the 'real' minimum detectable activity.
- \* A negative RESULT is underlined if it is less than the negative of its 2 sigma counting ERROR.
- \* When reporting a Method Blank, a RESULT is underlined if greater than its MDA. If the MDA is blank, the 2 sigma counting error is used in the comparison.

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SUMMARY DATA SECTION

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Protocol Hanford  
Version Ver 1.0  
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**TMA/RICHMOND**  
**SAMPLE DELIVERY GROUP H0198**

SDG 7492  
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**REPORT GUIDE**

Client Hanford  
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**LAB CONTROL SAMPLE**

The Lab Control Sample Report shows all results, recoveries and primary supporting information for one Lab Control Sample.

The following notes apply to this report:

- \* All fields in common with the Data Sheet Report have similar usage. Refer to its Report Guide for details.
- \* An amount **ADDED** is the lab's value for the actual amount spiked into this sample with its **ERROR** an estimate of the error of this amount.

An amount added is underlined if its ratio to the corresponding RDL is outside protocol specified limits.

- \* **REC** (Recovery) is **RESULT** divided by **ADDED** expressed as a percent.
- \* The first, computed limits for the recovery reflect:
  1. The error of **RESULT**, including that introduced by rounding the result prior to printing.

If the limits are labeled (TOTAL), they include preparation error in the result. If labeled (COUNT), they do not.
  2. The error of **ADDED**.
  3. A lab specified, per analyte bias. The bias changes the center of the computed limits.
- \* The second limits are protocol defined upper and lower QC limits for the recovery.
- \* The recovery is underlined if it is outside either of these ranges.

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DUPLICATE

The Duplicate Report shows all results, differences and primary supporting information for one Duplicate and associated Original sample.

The following notes apply to this report:

- \* All fields in common with the Data Sheet Report have similar usage. This applies both to the Duplicate and Original sample data. Refer to the Data Sheet Report Guide for details.

If the Duplicate has data for a TEST and the lab did not do this test to the Original, the Original's RESULTS are underlined.

- \* The RPD (Relative Percent Difference) is the absolute value of the difference of the RESULTS divided by their average expressed as a percent.

If both RESULTS are less than their MDAs, no RPD is computed and a '-' is printed.

For an analyte, if the lab did work for both samples but has data for only one, the MDA from the sample with data is used as the other's result in the RPD.

- \* The first, computed limit is the sum, as square root of sum of squares, of the errors of the results divided by the average result as a percent, hence the relative error of the difference rather than the error of the relative difference. The errors include those introduced by rounding the RESULTS prior to printing.

If this limit is labeled TOT, it includes the preparation error in the RESULTS. If labeled CNT, it does not.

This value reported for this limit is at most 999.

- \* The second limit for the RPD is the larger of:
  1. A fixed percentage specified in the protocol.

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SUMMARY DATA SECTION

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**GUIDE, cont.**

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**DUPLICATE**

2. A protocol factor (typically 2) times the average MDA as a percent of the average result. This limit applies when the results are close to the MDAs.

- \* The RPD is underlined if it is greater than either limit.
- \* If specified by the lab, the second limit column is replaced by the Difference Error Ratio (DER), which is the absolute value of the difference of the results divided by the quadratic sum of their one sigma errors, the same errors as used in the first limit.

Except for differences due to rounding, the DER is the same as the RPD divided by the first RPD limit with the limit scaled to 1 sigma.

- \* The DER is underlined if it is greater than the sigma factor, typically 2 or 3, shown in the header for the first RPD limit.

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**SUMMARY DATA SECTION**

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Protocol Hanford  
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Contact N. Joseph Verville

## REPORT GUIDE

Client Hanford  
Contract TRB-SBB-207925  
Case no SDG H0198

### MATRIX SPIKE

The Matrix Spike Report shows all results, recoveries and primary supporting information for one Matrix Spike and associated Original sample.

The following notes apply to this report:

- \* All fields in common with the Data Sheet Report have similar usage. This applies both to the Spiked and Original sample data. Refer to the Data Sheet Report Guide for details.

If the Spike has data for a TEST and the lab did not do this test to the Original, the Original's RESULTS are underlined.

- \* An amount ADDED is the lab's value for the actual amount spiked into the Spike sample with its ERROR an estimate of the error of this amount.

An amount is underlined if its ratio to the corresponding RDL is outside protocol specified limits.

- \* REC (Recovery) is the Spike RESULT minus the Original RESULT divided by ADDED expressed as a percent.

- \* The first, computed limits for the recovery reflect:

1. The errors of the two RESULTS, including those introduced by rounding them prior to printing.

If the limits are labeled (TOTAL), they include preparation error in the result. If labeled (COUNT), they do not.

2. The error of ADDED.

3. A lab specified, per analyte bias. The bias changes the center of the computed limits.

- \* The second limits are protocol defined upper and lower QC limits

#### REPORT GUIDES

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#### SUMMARY DATA SECTION

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Contact N. Joseph Verville

GUIDE, cont.

Client Hanford  
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MATRIX SPIKE

for the recovery.

These limits are left blank if the Original RESULT is more than a protocol defined factor (typically 4) times ADDED. This is a way of accounting for that when the spike is small compared to the amount in the original sample, the recovery is unreliable.

- \* The recovery is underlined (out of spec) if it is outside either of these ranges.

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**TMA / RICHMOND**  
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SDG 7492  
Contact N. Joseph Verville

**REPORT GUIDE**

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**METHOD SUMMARY**

The Method Summary Report has two tables. One shows up to five results measured using one method. The other has performance data for the method. There is one report for each TEST, as used on the Data Sheet Report.

The following notes apply to this report:

- \* Each table is subdivided into sections, one for each preparation batch. A preparation batch is a group of aliquots prepared at roughly the same time in one work area of the lab using the same method.

There should be Lab Control Sample and Method Blank results in each preparation batch since this close correspondence makes the QC meaningful. Depending on lab policy, Duplicates need not occur in each batch since they QC sample dependencies such as matrix effects.

- \* The RAW TEST column shows the test code used in the raw data to identify a particular analysis if it is different than the test code in the header of the report. This occurs in special cases due to method specific details about how the lab labels work.

The Lab Sample or Planchet ID combined with the (Raw) Test Code and Suffix uniquely identify the raw data for each analysis.

- \* If a result is less than both its MDA and RDL, it is replaced by just 'U' on this report. If it is greater than or equal to the RDL but less than the MDA, the result is shown with a 'U' flag.

The J and X flags are as on the data sheet.

- \* Non-U results for Method Blanks are underlined to indicate possible contamination of other samples in the preparation batch. The Method Blank Report has supporting data.
- \* Lab Control Sample and Matrix Spike results are shown as: ok, No data, LOW or HIGH, with the last two underlined. 'No data'

**REPORT GUIDES**

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**SUMMARY DATA SECTION**

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TMA/RICHMOND  
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GUIDE, cont.

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METHOD SUMMARY

means no amount ADDED was specified. 'LOW' and 'HIGH' correspond to when the recovery is underlined on the Lab Control Sample or Matrix Spike Report. See these reports for supporting data.

- \* Duplicate sample results are shown as: ok, No data, or OUT, with the last two underlined. 'No data' means there was no original sample data found for this duplicate. 'OUT' corresponds to when the RPD is underlined on the Duplicate Report. See this report for supporting data.
- \* If the MDA column is labeled 'MAX MDA', there was more than one result measured by the reported method and the MDA shown is the largest MDA. If not all these results have the same RDL, the MAX MDA reflects only those results with RDL equal to the smallest one.

MDAs are underlined if greater than the printed RDL.

- \* Aliquots are underlined if less than the nominal value specified for the method.
- \* Preparation factors are underlined if greater than the nominal value specified for the method.
- \* Dilution factors are underlined if greater than the nominal value specified for the method.
- \* Residues are underlined if outside the range specified for the method. Residues are not printed if yields are.
- \* Yields, which may be gravimetric, radiometric or some type of recovery depending on the method, are underlined if outside the range specified for the method.
- \* Efficiencies are underlined if outside the range specified for the method. Efficiencies are detector and geometry dependent so this test is only approximate.

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SUMMARY DATA SECTION

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**GUIDE, cont.**

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**METHOD SUMMARY**

- \* Count times are underlined if less than the nominal value specified for the method.
- \* Resolutions (as FWHM; Full Width at Half Max) are underlined if greater than the method specified limit.
- \* Tracer drifts are underlined if their absolute values are greater than the method specified limit. Tracer drifts are not printed if percent moistures are.
- \* Days Held are underlined if greater than the holding time specified in the protocol.
- \* Analysis dates are underlined if before their planchet's preparation date or, if a limit is specified, too far after it.

For some methods, ratios as percentages and error estimates for them are computed for pairs of results. A ratio column header like '1+3' means the ratio of the first result column and the third result column.

Ratios are not computed for Lab Control Sample, Method Blank or Matrix Spike results since their matrices are not necessarily similar to client samples'.

The error estimate for a ratio of results from one planchet reflects only counting errors since other errors should be correlated. For a ratio involving different planchets, if QC limits are computed based on total errors, the error for the ratio allows for the preparation errors for the planchets.

The ratio is underlined (out of spec) if the absolute value of its difference from the nominal value is greater than its error estimate. If no nominal value is specified, this test is not done.

For Gross Alpha or Gross Beta results, there may be a column showing the sum of other Alpha or Beta emitters. This sum includes all relevant

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Contact N. Joseph Verville

**GUIDE, cont.**

Client Hanford  
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**METHOD SUMMARY**

results in the DVD database, whether reported or not. Results in the sum are weighted by a particles/decay value specified by the lab for each relevant analyte. Results less than their MDA are not included. No sums are computed for Lab Control, Method Blank or Matrix Spike samples since their various planchets may not be physically related.

If a ratio of total isotopic to Gross Alpha or Beta is shown, the error for the ratio reflects both the error in the Gross result and the sum, as square root of sum of squares, of the errors in the isotopic results.

For total elemental uranium or thorium results, there may be a column showing the total weight computed from associated isotopic results. Ignoring results less than their MDAs, this is a weighted sum of the isotopic results. The weights depend on the molecular weight and half-life of each isotope so as to convert activities (decays) to weight (atoms).

If a ratio of total computed to measured elemental uranium or thorium is shown, the error for the ratio reflects the errors in all the measurements.

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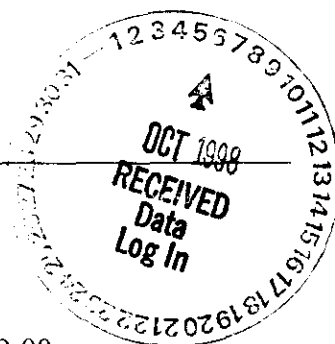


**RECRA  
LabNet**

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*Virtual Laboratories Everywhere*

**Recra LabNet Philadelphia  
Analytical Report**



**Client :** TNU-HANFORD B98-060

**RFW# :** 9808L339

**SDG/SAF# :** H0198/ B98-060

**W.O.# :** 10985-001-001-9999-00

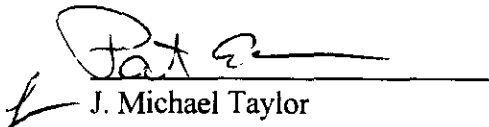
**Date Received:** 08/15/98

**METALS CASE NARRATIVE**

1. This narrative covers the analyses of 3 water samples.
2. Samples were prepared and analyzed in accordance with methods checked on the attached glossary. The matrix spike and duplicate analyses for Mercury was performed on two different samples due to limited volume.
3. All analyses were performed within the required holding times.
4. The cooler temperature has been recorded on the Chain of Custody.
5. All Initial and Continuing Calibration Verifications (ICV/CCVs) were within control limits.
6. All Initial and Continuing Calibration Blanks (ICB/CCBs) were within control limits.
7. The preparation/method blanks for 2 analytes were outside method criteria. Refer to the Inorganics Method Blank Data Summary.
  - a.) The MB results for Aluminum and Iron were greater than the Practical Quantitation Limit (PQL) {3x the (IDL) Instrument Detection Level} and all samples read less than 20 times the MB concentration. However, no corrective action criteria for MBs were provided in SW846 method 6010B. The sample results were reported herein "uncorrected" for the levels found in the MB.
8. All ICP Interference Check Standards were within control limits.
9. All laboratory control samples (LCS) were within the laboratory control limits. Refer to the Inorganics Laboratory Control Standards Report.
10. All matrix spike (MS) and matrix spike duplicate (MSD) recoveries were within the 80-120% control limits. Refer to the Inorganics Accuracy Report.
11. The duplicate analyses for 4 analytes were outside the 20% Relative Percent Difference (RPD) control limits. Refer to the Inorganics Precision Report.

The results presented in this report relate only to the analytical testing and conditions of the samples at receipt and during storage. All pages of this report are integral parts of the analytical data. Therefore, this report should only be reproduced in its entirety of 19 pages.

12. For the purposes of this report, the data has been reported to the Instrument Detection Limit (IDL). Values between the IDL and the Practical Quantitation Limit (PQL) are acquired in a region of less-certain quantification.

  
J. Michael Taylor  
Vice President  
Philadelphia Analytical Laboratory

jjw\m08-339

10-1-98  
Date



# METALS METHOD GLOSSARY

The following methods are used as reference for the digestion and analysis of samples contained within this Recra Lot#: 9802L339

Leaching Procedure: ☐ 1310 ☐ 1311 ☐ 1312 ☐ Other: \_\_\_\_\_

CLP Metals ☐ Digestion and ☐ Analysis Methods: ☐ ILM03.0 ☐ ILM04.0

Metals Digestion Methods: ☒ 3005A ☐ 3010A ☐ 3015 ☐ 3020A ☐ 3050A ☐ 3051 ☐ 200.7 ☐ SS17  
☐ Other: \_\_\_\_\_

## Metals Analysis Methods

|             | SW846  | EPA  | STD MTD                        | EPA<br>OSWR                   | USATHAMA                      |
|-------------|--|--|--------------------------------|-------------------------------|-------------------------------|
| Aluminum    | <input checked="" type="checkbox"/> 6010B  | <input type="checkbox"/> 200.7   |                                |                               | <input type="checkbox"/> 99   |
| Antimony    | <input checked="" type="checkbox"/> 6010B <input type="checkbox"/> 7041 <sup>5</sup>               | <input type="checkbox"/> 200.7 <input type="checkbox"/> 204.2                                |                                |                               | <input type="checkbox"/> 99   |
| Arsenic     | <input checked="" type="checkbox"/> 6010B <input type="checkbox"/> 7060A <sup>5</sup>              | <input type="checkbox"/> 200.7 <input type="checkbox"/> 206.2                                | <input type="checkbox"/> 3113B |                               | <input type="checkbox"/> 99   |
| Barium      | <input checked="" type="checkbox"/> 6010B  | <input type="checkbox"/> 200.7   |                                |                               | <input type="checkbox"/> 99   |
| Beryllium   | <input checked="" type="checkbox"/> 6010B  | <input type="checkbox"/> 200.7   |                                |                               | <input type="checkbox"/> 99   |
| Bismuth     | <input type="checkbox"/> 6010B <sup>1</sup>  | <input type="checkbox"/> 200.7 <sup>1</sup>  |                                | <input type="checkbox"/> 1620 | <input type="checkbox"/> 99   |
| Boron       | <input checked="" type="checkbox"/> 6010B  | <input type="checkbox"/> 200.7   |                                |                               | <input type="checkbox"/> 99   |
| Cadmium     | <input checked="" type="checkbox"/> 6010B <input type="checkbox"/> 7131A <sup>5</sup>              | <input type="checkbox"/> 200.7 <input type="checkbox"/> 213.2                                |                                |                               | <input type="checkbox"/> 99   |
| Calcium     | <input checked="" type="checkbox"/> 6010B  | <input type="checkbox"/> 200.7   |                                |                               | <input type="checkbox"/> 99   |
| Chromium    | <input checked="" type="checkbox"/> 6010B <input type="checkbox"/> 7191 <sup>5</sup>               | <input type="checkbox"/> 200.7 <input type="checkbox"/> 218.2                                |                                |                               | <input type="checkbox"/> SS17 |
| Cobalt      | <input checked="" type="checkbox"/> 6010B  | <input type="checkbox"/> 200.7   |                                |                               | <input type="checkbox"/> 99   |
| Copper      | <input checked="" type="checkbox"/> 6010B <input type="checkbox"/> 7211 <sup>5</sup>               | <input type="checkbox"/> 200.7 <input type="checkbox"/> 220.2                                |                                |                               | <input type="checkbox"/> 99   |
| Iron        | <input checked="" type="checkbox"/> 6010B  | <input type="checkbox"/> 200.7   |                                |                               | <input type="checkbox"/> 99   |
| Lead        | <input checked="" type="checkbox"/> 6010B <input type="checkbox"/> 7421 <sup>5</sup>               | <input type="checkbox"/> 200.7 <input type="checkbox"/> 239.2                                | <input type="checkbox"/> 3113B |                               | <input type="checkbox"/> 99   |
| Lithium     | <input type="checkbox"/> 6010B <input type="checkbox"/> 7430 <sup>4</sup>                          | <input type="checkbox"/> 200.7   |                                | <input type="checkbox"/> 1620 | <input type="checkbox"/> 99   |
| Magnesium   | <input checked="" type="checkbox"/> 6010B  | <input type="checkbox"/> 200.7   |                                |                               | <input type="checkbox"/> 99   |
| Manganese   | <input checked="" type="checkbox"/> 6010B  | <input type="checkbox"/> 200.7   |                                |                               | <input type="checkbox"/> 99   |
| Mercury     | <input checked="" type="checkbox"/> 7470A <sup>3</sup> <input type="checkbox"/> 7471A <sup>3</sup> | <input type="checkbox"/> 245.1 <sup>2</sup> <input type="checkbox"/> 245.5 <sup>2</sup>      |                                |                               | <input type="checkbox"/> 99   |
| Molybdenum  | <input type="checkbox"/> 6010B   | <input type="checkbox"/> 200.7   |                                |                               | <input type="checkbox"/> 99   |
| Nickel      | <input checked="" type="checkbox"/> 6010B  | <input type="checkbox"/> 200.7   |                                |                               | <input type="checkbox"/> 99   |
| Potassium   | <input checked="" type="checkbox"/> 6010B <input type="checkbox"/> 7610 <sup>4</sup>               | <input type="checkbox"/> 200.7 <input type="checkbox"/> 258.1 <sup>4</sup>                   |                                |                               | <input type="checkbox"/> 99   |
| Rare Earths | <input type="checkbox"/> 6010B <sup>1</sup>  | <input type="checkbox"/> 200.7 <sup>1</sup>  |                                | <input type="checkbox"/> 1620 | <input type="checkbox"/> 99   |
| Selenium    | <input checked="" type="checkbox"/> 6010B <input type="checkbox"/> 7740 <sup>5</sup>               | <input type="checkbox"/> 200.7 <input type="checkbox"/> 270.2                                | <input type="checkbox"/> 3113B |                               | <input type="checkbox"/> 99   |
| Silicon     | <input type="checkbox"/> 6010B <sup>1</sup>  | <input type="checkbox"/> 200.7   |                                | <input type="checkbox"/> 1620 | <input type="checkbox"/> 99   |
| Silica      | <input type="checkbox"/> 6010B   | <input type="checkbox"/> 200.7   |                                | <input type="checkbox"/> 1620 | <input type="checkbox"/> 99   |
| Silver      | <input checked="" type="checkbox"/> 6010B <input type="checkbox"/> 7761 <sup>5</sup>               | <input type="checkbox"/> 200.7 <input type="checkbox"/> 272.2                                |                                |                               | <input type="checkbox"/> 99   |
| Sodium      | <input checked="" type="checkbox"/> 6010B <input type="checkbox"/> 7770 <sup>4</sup>               | <input type="checkbox"/> 200.7 <input type="checkbox"/> 273.1 <sup>4</sup>                   |                                |                               | <input type="checkbox"/> 99   |
| Strontium   | <input type="checkbox"/> 6010B   | <input type="checkbox"/> 200.7   |                                |                               | <input type="checkbox"/> 99   |
| Thallium    | <input checked="" type="checkbox"/> 6010B <input type="checkbox"/> 7841 <sup>5</sup>               | <input type="checkbox"/> 200.7 <input type="checkbox"/> 279.2 <input type="checkbox"/> 200.9 |                                |                               | <input type="checkbox"/> 99   |
| Tin         | <input type="checkbox"/> 6010B   | <input type="checkbox"/> 200.7   |                                |                               | <input type="checkbox"/> 99   |
| Titanium    | <input type="checkbox"/> 6010B   | <input type="checkbox"/> 200.7   |                                |                               | <input type="checkbox"/> 99   |
| Uranium     | <input type="checkbox"/> 6010B <sup>1</sup>  | <input type="checkbox"/> 200.7 <sup>1</sup>  |                                | <input type="checkbox"/> 1620 | <input type="checkbox"/> 99   |
| Vanadium    | <input checked="" type="checkbox"/> 6010B  | <input type="checkbox"/> 200.7   |                                |                               | <input type="checkbox"/> 99   |
| Zinc        | <input checked="" type="checkbox"/> 6010B  | <input type="checkbox"/> 200.7   |                                |                               | <input type="checkbox"/> 99   |
| Zirconium   | <input type="checkbox"/> 6010B <sup>1</sup>  | <input type="checkbox"/> 200.7 <sup>1</sup>  |                                | <input type="checkbox"/> 1620 | <input type="checkbox"/> 99   |

Other: \_\_\_\_\_

Method: \_\_\_\_\_

## **METHOD REFERENCES AND DATA QUALIFIERS**

### **DATA QUALIFIERS**

U = Indicates that the parameter was not detected at or above the reported limit. The associated numerical value is the sample detection limit.

\* = Indicates that the original sample result is greater than 4x the spike amount added.

### **ABBREVIATIONS**

MB = Method or Preparation Blank.

MS = Matrix Spike.

MSD = Matrix Spike Duplicate.

REP = Sample Replicate

LCS = Laboratory Control Sample.

NC = Not calculated.

### **ANALYTICAL METAL METHODS**

1. Not included in the method element list.
2. Modified Hg: Hg1 and Hg2 require less total volume of digestate due to the autosampler analysis. Sample volumes and reagents for mercury determinations in water and soil have been proportionately scaled down to adapt to this semi-automated technique. The sample volume used for water analysis is 33 mL. For soils, 0.1 grams of sample is taken to a final volume of 50 mL (including all reagents).
3. Modified Hg: Hg1 and Hg2 require less total volume of digestate due to the autosampler analysis. Sample volumes and reagents for mercury determinations in water and soil have been proportionately scaled down to adapt to this semi-automated technique. The sample volume used for water analysis is 33 mL. For soils, three 0.1 gram of sample is taken to a final volume of 50 mL (including all reagents).
4. Flame AA.
5. Graphite Furnace AA.

RFW 21-21L-033/N-10/96

Recra LabNet - Lionville

INORGANICS DATA SUMMARY REPORT 09/30/98

CLIENT: TNU-HANFORD 898-060

RECRA LOT #: 9808L339

WORK ORDER: 10985-001-001-9999-00

| SAMPLE | SITE ID | ANALYTE          | RESULT | UNITS  | REPORTING<br>LIMIT | DILUTION<br>FACTOR |
|--------|---------|------------------|--------|--------|--------------------|--------------------|
| *****  | *****   | *****            | *****  | *****  | *****              | *****              |
| -001   | B0PFC1  | Silver, Total    | 4.6    | u UG/L | 4.6                | 1.0                |
|        |         | Aluminum, Total  | 76.2   | UG/L   | 26.6               | 1.0                |
|        |         | Arsenic, Total   | 38.1   | u UG/L | 38.1               | 1.0                |
|        |         | Barium, Total    | 95.4   | UG/L   | 3.3                | 1.0                |
|        |         | Beryllium, Total | 0.20   | u UG/L | 0.20               | 1.0                |
|        |         | Calcium, Total   | 193    | UG/L   | 14.1               | 1.0                |
|        |         | Cadmium, Total   | 4.0    | u UG/L | 4.0                | 1.0                |
|        |         | Cobalt, Total    | 5.8    | u UG/L | 5.8                | 1.0                |
|        |         | Chromium, Total  | 5.6    | u UG/L | 5.6                | 1.0                |
|        |         | Copper, Total    | 3.4    | UG/L   | 2.4                | 1.0                |
|        |         | Iron, Total      | 48.5   | UG/L   | 2.3                | 1.0                |
|        |         | Mercury, Total   | 0.10   | u UG/L | 0.10               | 1.0                |
|        |         | Potassium, Total | 606    | u UG/L | 606                | 1.0                |
|        |         | Magnesium, Total | 38.4   | u UG/L | 38.4               | 1.0                |
|        |         | Manganese, Total | 1.2    | u UG/L | 1.2                | 1.0                |
|        |         | Sodium, Total    | 1500   | UG/L   | 38.6               | 1.0                |
|        |         | Nickel, Total    | 9.5    | u UG/L | 9.5                | 1.0                |
|        |         | Lead, Total      | 37.2   | u UG/L | 37.2               | 1.0                |
|        |         | Antimony, Total  | 25.8   | u UG/L | 25.8               | 1.0                |
|        |         | Selenium, Total  | 44.0   | u UG/L | 44.0               | 1.0                |
|        |         | Thallium, Total  | 50.2   | u UG/L | 50.2               | 1.0                |
|        |         | Vanadium, Total  | 3.5    | u UG/L | 3.5                | 1.0                |
|        |         | Zinc, Total      | 2.8    | UG/L   | 1.6                | 1.0                |

Recra LabNet - Lionville

INORGANICS DATA SUMMARY REPORT 09/30/98

CLIENT: TNU-HANFORD B98-060

RECRA LOT #: 9808L339

WORK ORDER: 10985-001-001-9999-00

| SAMPLE | SITE ID | ANALYTE          | RESULT | UNITS  | REPORTING<br>LIMIT | DILUTION<br>FACTOR |
|--------|---------|------------------|--------|--------|--------------------|--------------------|
| -----  | -----   | -----            | -----  | -----  | -----              | -----              |
| -002   | B0PFC2  | Silver, Total    | 4.6    | u UG/L | 4.6                | 1.0                |
|        |         | Aluminum, Total  | 36.1   | UG/L   | 26.6               | 1.0                |
|        |         | Arsenic, Total   | 38.1   | u UG/L | 38.1               | 1.0                |
|        |         | Barium, Total    | 3.3    | u UG/L | 3.3                | 1.0                |
|        |         | Beryllium, Total | 0.20   | u UG/L | 0.20               | 1.0                |
|        |         | Calcium, Total   | 225    | UG/L   | 14.1               | 1.0                |
|        |         | Cadmium, Total   | 4.0    | u UG/L | 4.0                | 1.0                |
|        |         | Cobalt, Total    | 5.8    | u UG/L | 5.8                | 1.0                |
|        |         | Chromium, Total  | 5.6    | u UG/L | 5.6                | 1.0                |
|        |         | Copper, Total    | 5.3    | UG/L   | 2.4                | 1.0                |
|        |         | Iron, Total      | 24.9   | UG/L   | 2.3                | 1.0                |
|        |         | Mercury, Total   | 0.10   | u UG/L | 0.10               | 1.0                |
|        |         | Potassium, Total | 606    | u UG/L | 606                | 1.0                |
|        |         | Magnesium, Total | 107    | UG/L   | 38.4               | 1.0                |
|        |         | Manganese, Total | 1.2    | u UG/L | 1.2                | 1.0                |
|        |         | Sodium, Total    | 903    | UG/L   | 38.6               | 1.0                |
|        |         | Nickel, Total    | 9.5    | u UG/L | 9.5                | 1.0                |
|        |         | Lead, Total      | 37.2   | u UG/L | 37.2               | 1.0                |
|        |         | Antimony, Total  | 25.8   | u UG/L | 25.8               | 1.0                |
|        |         | Selenium, Total  | 44.0   | u UG/L | 44.0               | 1.0                |
|        |         | Thallium, Total  | 50.2   | u UG/L | 50.2               | 1.0                |
|        |         | Vanadium, Total  | 3.5    | u UG/L | 3.5                | 1.0                |
|        |         | Zinc, Total      | 7.9    | UG/L   | 1.6                | 1.0                |

Recra LabNet - Lionville

INORGANICS DATA SUMMARY REPORT 09/30/98

CLIENT: TNU-HANFORD B98-060

RECRA LOT #: 9808L339

WORK ORDER: 10985-001-001-9999-00

| SAMPLE | SITE ID | ANALYTE          | RESULT | UNITS  | REPORTING<br>LIMIT | DILUTION<br>FACTOR |
|--------|---------|------------------|--------|--------|--------------------|--------------------|
| -----  | -----   | -----            | -----  | -----  | -----              | -----              |
| -003   | B0PPC3  | Silver, Total    | 4.6    | u UG/L | 4.6                | 1.0                |
|        |         | Aluminum, Total  | 97.9   | UG/L   | 26.6               | 1.0                |
|        |         | Arsenic, Total   | 38.1   | u UG/L | 38.1               | 1.0                |
|        |         | Barium, Total    | 137    | UG/L   | 3.3                | 1.0                |
|        |         | Beryllium, Total | 0.20   | u UG/L | 0.20               | 1.0                |
|        |         | Calcium, Total   | 229    | UG/L   | 14.1               | 1.0                |
|        |         | Cadmium, Total   | 4.0    | u UG/L | 4.0                | 1.0                |
|        |         | Cobalt, Total    | 5.8    | u UG/L | 5.8                | 1.0                |
|        |         | Chromium, Total  | 5.6    | u UG/L | 5.6                | 1.0                |
|        |         | Copper, Total    | 2.4    | u UG/L | 2.4                | 1.0                |
|        |         | Iron, Total      | 71.2   | UG/L   | 2.3                | 1.0                |
|        |         | Mercury, Total   | 0.10   | u UG/L | 0.10               | 1.0                |
|        |         | Potassium, Total | 606    | u UG/L | 606                | 1.0                |
|        |         | Magnesium, Total | 80.1   | UG/L   | 38.4               | 1.0                |
|        |         | Manganese, Total | 1.2    | u UG/L | 1.2                | 1.0                |
|        |         | Sodium, Total    | 1390   | UG/L   | 38.6               | 1.0                |
|        |         | Nickel, Total    | 9.5    | u UG/L | 9.5                | 1.0                |
|        |         | Lead, Total      | 37.2   | u UG/L | 37.2               | 1.0                |
|        |         | Antimony, Total  | 25.8   | u UG/L | 25.8               | 1.0                |
|        |         | Selenium, Total  | 44.0   | u UG/L | 44.0               | 1.0                |
|        |         | Thallium, Total  | 50.2   | u UG/L | 50.2               | 1.0                |
|        |         | Vanadium, Total  | 3.5    | u UG/L | 3.5                | 1.0                |
|        |         | Zinc, Total      | 5.5    | u UG/L | 1.6                | 1.0                |

Recra LabNet - Lionville

INORGANICS METHOD BLANK DATA SUMMARY PAGE 09/30/98

CLIENT: TNU-HANFORD B98-060

RECRA LOT #: 9808L339

WORK ORDER: 10985-001-001-9999-00

| SAMPLE | SITE ID     | ANALYTE          | RESULT | UNITS | REPORTING | DILUTION |
|--------|-------------|------------------|--------|-------|-----------|----------|
|        |             |                  |        |       | LIMIT     | FACTOR   |
| *****  | *****       | *****            | *****  | ***** | *****     | *****    |
| BLANK1 | 98L1203-MB1 | Silver, Total    | 4.8    | UG/L  | 4.6       | 1.0      |
|        |             | Aluminum, Total  | 84.2   | UG/L  | 26.6      | 1.0      |
|        |             | Arsenic, Total   | 38.1 u | UG/L  | 38.1      | 1.0      |
|        |             | Barium, Total    | 3.3 u  | UG/L  | 3.3       | 1.0      |
|        |             | Beryllium, Total | 0.20 u | UG/L  | 0.20      | 1.0      |
|        |             | Calcium, Total   | 23.3   | UG/L  | 14.1      | 1.0      |
|        |             | Cadmium, Total   | 4.0 u  | UG/L  | 4.0       | 1.0      |
|        |             | Cobalt, Total    | 5.8 u  | UG/L  | 5.8       | 1.0      |
|        |             | Chromium, Total  | 6.0    | UG/L  | 5.6       | 1.0      |
|        |             | Copper, Total    | 3.1    | UG/L  | 2.4       | 1.0      |
|        |             | Iron, Total      | 20.3   | UG/L  | 2.3       | 1.0      |
|        |             | Potassium, Total | 606 u  | UG/L  | 606       | 1.0      |
|        |             | Magnesium, Total | 38.4 u | UG/L  | 38.4      | 1.0      |
|        |             | Manganese, Total | 1.2 u  | UG/L  | 1.2       | 1.0      |
|        |             | Sodium, Total    | 62.5   | UG/L  | 38.6      | 1.0      |
|        |             | Nickel, Total    | 9.5 u  | UG/L  | 9.5       | 1.0      |
|        |             | Lead, Total      | 37.2 u | UG/L  | 37.2      | 1.0      |
|        |             | Antimony, Total  | 25.8 u | UG/L  | 25.8      | 1.0      |
|        |             | Selenium, Total  | 44.0 u | UG/L  | 44.0      | 1.0      |
|        |             | Thallium, Total  | 50.2 u | UG/L  | 50.2      | 1.0      |
|        |             | Vanadium, Total  | 3.6    | UG/L  | 3.5       | 1.0      |
|        |             | Zinc, Total      | 4.7    | UG/L  | 1.6       | 1.0      |
| BLANK1 | 98C0429-MB1 | Mercury, Total   | 0.10 u | UG/L  | 0.10      | 1.0      |

Recra LabNet - Lionville

INORGANICS ACCURACY REPORT 09/30/98

CLIENT: TWU-HANFORD B98-060

RECRA LOT #: 9808L339

WORK ORDER: 10985-001-001-9999-00

| SAMPLE | SITE ID | ANALYTE          | SPIKED<br>SAMPLE | INITIAL<br>RESULT | SPIKED<br>AMOUNT | %RECOV | DILUTION<br>FACTOR (SPK) |
|--------|---------|------------------|------------------|-------------------|------------------|--------|--------------------------|
| -----  | -----   | -----            | -----            | -----             | -----            | -----  | -----                    |
| -002   | B0PPC2  | Silver, Total    | 56.4             | 4.6 u             | 50.0             | 112.8  | 1.0                      |
|        |         | Aluminum, Total  | 2120             | 36.1              | 2000             | 104.2  | 1.0                      |
|        |         | Arsenic, Total   | 2100             | 38.1 u            | 2000             | 105.1  | 1.0                      |
|        |         | Barium, Total    | 2070             | 3.3 u             | 2000             | 103.4  | 1.0                      |
|        |         | Beryllium, Total | 47.5             | 0.20u             | 50.0             | 95.0   | 1.0                      |
|        |         | Calcium, Total   | 26400            | 225               | 25000            | 104.8  | 1.0                      |
|        |         | Cadmium, Total   | 52.5             | 4.0 u             | 50.0             | 105.0  | 1.0                      |
|        |         | Cobalt, Total    | 529              | 5.8 u             | 500              | 105.7  | 1.0                      |
|        |         | Chromium, Total  | 210              | 5.6 u             | 200              | 105.2  | 1.0                      |
|        |         | Copper, Total    | 259              | 5.3               | 250              | 101.6  | 1.0                      |
|        |         | Iron, Total      | 1060             | 24.9              | 1000             | 103.4  | 1.0                      |
|        |         | Mercury, Total   | 0.97             | 0.10u             | 1.0              | 96.6   | 1.0                      |
|        |         | Potassium, Total | 25600            | 606 u             | 25000            | 102.4  | 1.0                      |
|        |         | Magnesium, Total | 25700            | 107               | 25000            | 102.4  | 1.0                      |
|        |         | Manganese, Total | 521              | 1.2 u             | 500              | 104.2  | 1.0                      |
|        |         | Sodium, Total    | 26100            | 903               | 25000            | 100.6  | 1.0                      |
|        |         | Nickel, Total    | 533              | 9.5 u             | 500              | 106.6  | 1.0                      |
|        |         | Lead, Total      | 525              | 37.2 u            | 500              | 105.0  | 1.0                      |
|        |         | Antimony, Total  | 535              | 25.8 u            | 500              | 107.1  | 1.0                      |
|        |         | Selenium, Total  | 2100             | 44.0 u            | 2000             | 104.8  | 1.0                      |
|        |         | Thallium, Total  | 2050             | 50.2 u            | 2000             | 102.4  | 1.0                      |
|        |         | Vanadium, Total  | 526              | 3.5 u             | 500              | 105.1  | 1.0                      |
|        |         | Zinc, Total      | 571              | 7.9               | 500              | 112.6  | 1.0                      |

Recra LabNet - Lionville

INORGANICS PRECISION REPORT 09/30/98

CLIENT: TNU-HANFORD B98-060

RECRA LOT #: 98081339

WORK ORDER: 10985-001-001-9999-00

| SAMPLE  | SITE ID | ANALYTE        | INITIAL<br>RESULT | REPLICATE | RPD   | DILUTION<br>FACTOR(REP) |
|---------|---------|----------------|-------------------|-----------|-------|-------------------------|
| *****   | *****   | *****          | *****             | *****     | ***** | *****                   |
| -001REP | B0PPC1  | Mercury, Total | 0.10u             | 0.10u     | NC    | 1.0                     |

Recra LabNet - Lionville

INORGANICS PRECISION REPORT 09/30/98

CLIENT: TNU-HANFORD B98-060

RECRA LOT #: 9808L339

WORK ORDER: 10985-001-001-9999-00

| SAMPLE  | SITE ID | ANALYTE          | INITIAL |           |        | DILUTION<br>FACTOR (REP) |
|---------|---------|------------------|---------|-----------|--------|--------------------------|
|         |         |                  | RESULT  | REPLICATE | RPD    |                          |
| -----   | -----   | -----            | -----   | -----     | -----  | -----                    |
| -002REP | B0PPC2  | Silver, Total    | 4.6 u   | 4.6 u     | NC     | 1.0                      |
|         |         | Aluminum, Total  | 36.1    | 26.6 u    | NC-200 | 1.0                      |
|         |         | Arsenic, Total   | 38.1 u  | 38.1 u    | NC     | 1.0                      |
|         |         | Barium, Total    | 3.3 u   | 3.3 u     | NC     | 1.0                      |
|         |         | Beryllium, Total | 0.20u   | 0.20u     | NC     | 1.0                      |
|         |         | Calcium, Total   | 225     | 197       | 13.4   | 1.0                      |
|         |         | Cadmium, Total   | 4.0 u   | 4.0 u     | NC     | 1.0                      |
|         |         | Cobalt, Total    | 5.8 u   | 5.8 u     | NC     | 1.0                      |
|         |         | Chromium, Total  | 5.6 u   | 5.6 u     | NC     | 1.0                      |
|         |         | Copper, Total    | 5.3     | 4.8       | 9.9    | 1.0                      |
|         |         | Iron, Total      | 24.9    | 34.2      | 31.5   | 1.0                      |
|         |         | Potassium, Total | 606 u   | 606 u     | NC     | 1.0                      |
|         |         | Magnesium, Total | 107     | 64.7      | 49.4   | 1.0                      |
|         |         | Manganese, Total | 1.2 u   | 1.2 u     | NC     | 1.0                      |
|         |         | Sodium, Total    | 903     | 958       | 5.9    | 1.0                      |
|         |         | Nickel, Total    | 9.5 u   | 9.5 u     | NC     | 1.0                      |
|         |         | Lead, Total      | 37.2 u  | 37.2 u    | NC     | 1.0                      |
|         |         | Antimony, Total  | 25.8 u  | 25.8 u    | NC     | 1.0                      |
|         |         | Selenium, Total  | 44.0 u  | 44.0 u    | NC     | 1.0                      |
|         |         | Thallium, Total  | 50.2 u  | 50.2 u    | NC     | 1.0                      |
|         |         | Vanadium, Total  | 3.5 u   | 3.5 u     | NC     | 1.0                      |
|         |         | Zinc, Total      | 7.9     | 41.4      | 135.9  | 1.0                      |

Correction  
9/30/98

Recra LabNet - Lionville

INORGANICS LABORATORY CONTROL STANDARDS REPORT 09/30/98

CLIENT: TNU-HANFORD B98-060

RECRA LOT #: 9808L339

WORK ORDER: 10985-001-001-9999-00

| SAMPLE | SITE ID     | ANALYTE        | SPIKED<br>SAMPLE | SPIKED<br>AMOUNT | UNITS | %RECOV |
|--------|-------------|----------------|------------------|------------------|-------|--------|
| -----  | -----       | -----          | -----            | -----            | ----- | -----  |
| LCS1   | 98L1203-LC1 | Silver, LCS    | 520              | 500              | UG/L  | 104.0  |
|        |             | Aluminum, LCS  | 5170             | 5000             | UG/L  | 103.4  |
|        |             | Arsenic, LCS   | 10300            | 10000            | UG/L  | 103.2  |
|        |             | Barium, LCS    | 5140             | 5000             | UG/L  | 102.8  |
|        |             | Beryllium, LCS | 234              | 250              | UG/L  | 93.8   |
|        |             | Calcium, LCS   | 24900            | 25000            | UG/L  | 99.7   |
|        |             | Cadmium, LCS   | 241              | 250              | UG/L  | 96.2   |
|        |             | Cobalt, LCS    | 2530             | 2500             | UG/L  | 101.4  |
|        |             | Chromium, LCS  | 509              | 500              | UG/L  | 101.8  |
|        |             | Copper, LCS    | 1290             | 1250             | UG/L  | 103.4  |
|        |             | Iron, LCS      | 5050             | 5000             | UG/L  | 100.9  |
|        |             | Potassium, LCS | 25200            | 25000            | UG/L  | 101.0  |
|        |             | Magnesium, LCS | 24700            | 25000            | UG/L  | 98.8   |
|        |             | Manganese, LCS | 756              | 750              | UG/L  | 100.9  |
|        |             | Sodium, LCS    | 25400            | 25000            | UG/L  | 101.7  |
|        |             | Nickel, LCS    | 2020             | 2000             | UG/L  | 100.8  |
|        |             | Lead, LCS      | 2480             | 2500             | UG/L  | 99.2   |
|        |             | Antimony, LCS  | 3020             | 3000             | UG/L  | 100.5  |
|        |             | Selenium, LCS  | 10300            | 10000            | UG/L  | 102.8  |
|        |             | Thallium, LCS  | 10300            | 10000            | UG/L  | 102.8  |
|        |             | Vanadium, LCS  | 2540             | 2500             | UG/L  | 101.6  |
|        |             | Zinc, LCS      | 998              | 1000             | UG/L  | 99.8   |
| LCS1   | 98C0429-LC1 | Mercury, LCS   | 5.6              | 5.0              | UG/L  | 111.0  |

Recra LabNet - Lionville Laboratory  
INORGANIC ANALYTICAL DATA PACKAGE FOR  
TNU-HANFORD B98-060

DATE RECEIVED: 08/15/98

RFW LOT # :9808L339

| CLIENT ID /ANALYSIS | RFW # | MTX | PREP # | COLLECTION | EXTR/PREP | ANALYSIS |
|---------------------|-------|-----|--------|------------|-----------|----------|
|---------------------|-------|-----|--------|------------|-----------|----------|

BOPPC1

|                  |         |   |         |          |          |          |
|------------------|---------|---|---------|----------|----------|----------|
| SILVER, TOTAL    | 001     | W | 98L1203 | 08/10/98 | 09/18/98 | 09/21/98 |
| ALUMINUM, TOTAL  | 001     | W | 98L1203 | 08/10/98 | 09/18/98 | 09/21/98 |
| ARSENIC, TOTAL   | 001     | W | 98L1203 | 08/10/98 | 09/18/98 | 09/21/98 |
| BARIUM, TOTAL    | 001     | W | 98L1203 | 08/10/98 | 09/18/98 | 09/21/98 |
| BERYLLIUM, TOTAL | 001     | W | 98L1203 | 08/10/98 | 09/18/98 | 09/21/98 |
| CALCIUM, TOTAL   | 001     | W | 98L1203 | 08/10/98 | 09/18/98 | 09/21/98 |
| CADMIUM, TOTAL   | 001     | W | 98L1203 | 08/10/98 | 09/18/98 | 09/21/98 |
| COBALT, TOTAL    | 001     | W | 98L1203 | 08/10/98 | 09/18/98 | 09/21/98 |
| CHROMIUM, TOTAL  | 001     | W | 98L1203 | 08/10/98 | 09/18/98 | 09/21/98 |
| COPPER, TOTAL    | 001     | W | 98L1203 | 08/10/98 | 09/18/98 | 09/21/98 |
| IRON, TOTAL      | 001     | W | 98L1203 | 08/10/98 | 09/18/98 | 09/21/98 |
| MERCURY, TOTAL   | 001     | W | 98C0429 | 08/10/98 | 09/03/98 | 09/03/98 |
| MERCURY, TOTAL   | 001 REP | W | 98C0429 | 08/10/98 | 09/03/98 | 09/03/98 |
| POTASSIUM, TOTAL | 001     | W | 98L1203 | 08/10/98 | 09/18/98 | 09/21/98 |
| MAGNESIUM, TOTAL | 001     | W | 98L1203 | 08/10/98 | 09/18/98 | 09/21/98 |
| MANGANESE, TOTAL | 001     | W | 98L1203 | 08/10/98 | 09/18/98 | 09/21/98 |
| SODIUM, TOTAL    | 001     | W | 98L1203 | 08/10/98 | 09/18/98 | 09/21/98 |
| NICKEL, TOTAL    | 001     | W | 98L1203 | 08/10/98 | 09/18/98 | 09/21/98 |
| LEAD, TOTAL      | 001     | W | 98L1203 | 08/10/98 | 09/18/98 | 09/21/98 |
| ANTIMONY, TOTAL  | 001     | W | 98L1203 | 08/10/98 | 09/18/98 | 09/21/98 |
| SELENIUM, TOTAL  | 001     | W | 98L1203 | 08/10/98 | 09/18/98 | 09/21/98 |
| THALLIUM, TOTAL  | 001     | W | 98L1203 | 08/10/98 | 09/18/98 | 09/21/98 |
| VANADIUM, TOTAL  | 001     | W | 98L1203 | 08/10/98 | 09/18/98 | 09/21/98 |
| ZINC, TOTAL      | 001     | W | 98L1203 | 08/10/98 | 09/18/98 | 09/21/98 |

BOPPC2

|                 |         |   |         |          |          |          |
|-----------------|---------|---|---------|----------|----------|----------|
| SILVER, TOTAL   | 002     | W | 98L1203 | 08/10/98 | 09/18/98 | 09/21/98 |
| SILVER, TOTAL   | 002 REP | W | 98L1203 | 08/10/98 | 09/18/98 | 09/21/98 |
| SILVER, TOTAL   | 002 MS  | W | 98L1203 | 08/10/98 | 09/18/98 | 09/21/98 |
| ALUMINUM, TOTAL | 002     | W | 98L1203 | 08/10/98 | 09/18/98 | 09/21/98 |
| ALUMINUM, TOTAL | 002 REP | W | 98L1203 | 08/10/98 | 09/18/98 | 09/21/98 |
| ALUMINUM, TOTAL | 002 MS  | W | 98L1203 | 08/10/98 | 09/18/98 | 09/21/98 |
| ARSENIC, TOTAL  | 002     | W | 98L1203 | 08/10/98 | 09/18/98 | 09/21/98 |
| ARSENIC, TOTAL  | 002 REP | W | 98L1203 | 08/10/98 | 09/18/98 | 09/21/98 |

Recra LabNet - Lionville Laboratory  
INORGANIC ANALYTICAL DATA PACKAGE FOR  
TNU-HANFORD B98-060

DATE RECEIVED: 08/15/98

RFW LOT # :9808L339

| CLIENT ID /ANALYSIS | RFW #   | MTX | PREP #  | COLLECTION | EXTR/PREP | ANALYSIS |
|---------------------|---------|-----|---------|------------|-----------|----------|
| ARSENIC, TOTAL      | 002 MS  | W   | 98L1203 | 08/10/98   | 09/18/98  | 09/21/98 |
| BARIUM, TOTAL       | 002     | W   | 98L1203 | 08/10/98   | 09/18/98  | 09/21/98 |
| BARIUM, TOTAL       | 002 REP | W   | 98L1203 | 08/10/98   | 09/18/98  | 09/21/98 |
| BARIUM, TOTAL       | 002 MS  | W   | 98L1203 | 08/10/98   | 09/18/98  | 09/21/98 |
| BERYLLIUM, TOTAL    | 002     | W   | 98L1203 | 08/10/98   | 09/18/98  | 09/21/98 |
| BERYLLIUM, TOTAL    | 002 REP | W   | 98L1203 | 08/10/98   | 09/18/98  | 09/21/98 |
| BERYLLIUM, TOTAL    | 002 MS  | W   | 98L1203 | 08/10/98   | 09/18/98  | 09/21/98 |
| CALCIUM, TOTAL      | 002     | W   | 98L1203 | 08/10/98   | 09/18/98  | 09/21/98 |
| CALCIUM, TOTAL      | 002 REP | W   | 98L1203 | 08/10/98   | 09/18/98  | 09/21/98 |
| CALCIUM, TOTAL      | 002 MS  | W   | 98L1203 | 08/10/98   | 09/18/98  | 09/21/98 |
| CADMIUM, TOTAL      | 002     | W   | 98L1203 | 08/10/98   | 09/18/98  | 09/21/98 |
| CADMIUM, TOTAL      | 002 REP | W   | 98L1203 | 08/10/98   | 09/18/98  | 09/21/98 |
| CADMIUM, TOTAL      | 002 MS  | W   | 98L1203 | 08/10/98   | 09/18/98  | 09/21/98 |
| COBALT, TOTAL       | 002     | W   | 98L1203 | 08/10/98   | 09/18/98  | 09/21/98 |
| COBALT, TOTAL       | 002 REP | W   | 98L1203 | 08/10/98   | 09/18/98  | 09/21/98 |
| COBALT, TOTAL       | 002 MS  | W   | 98L1203 | 08/10/98   | 09/18/98  | 09/21/98 |
| CHROMIUM, TOTAL     | 002     | W   | 98L1203 | 08/10/98   | 09/18/98  | 09/21/98 |
| CHROMIUM, TOTAL     | 002 REP | W   | 98L1203 | 08/10/98   | 09/18/98  | 09/21/98 |
| CHROMIUM, TOTAL     | 002 MS  | W   | 98L1203 | 08/10/98   | 09/18/98  | 09/21/98 |
| COPPER, TOTAL       | 002     | W   | 98L1203 | 08/10/98   | 09/18/98  | 09/21/98 |
| COPPER, TOTAL       | 002 REP | W   | 98L1203 | 08/10/98   | 09/18/98  | 09/21/98 |
| COPPER, TOTAL       | 002 MS  | W   | 98L1203 | 08/10/98   | 09/18/98  | 09/21/98 |
| IRON, TOTAL         | 002     | W   | 98L1203 | 08/10/98   | 09/18/98  | 09/21/98 |
| IRON, TOTAL         | 002 REP | W   | 98L1203 | 08/10/98   | 09/18/98  | 09/21/98 |
| IRON, TOTAL         | 002 MS  | W   | 98L1203 | 08/10/98   | 09/18/98  | 09/21/98 |
| MERCURY, TOTAL      | 002     | W   | 98C0429 | 08/10/98   | 09/03/98  | 09/03/98 |
| MERCURY, TOTAL      | 002 MS  | W   | 98C0429 | 08/10/98   | 09/03/98  | 09/03/98 |
| POTASSIUM, TOTAL    | 002     | W   | 98L1203 | 08/10/98   | 09/18/98  | 09/21/98 |
| POTASSIUM, TOTAL    | 002 REP | W   | 98L1203 | 08/10/98   | 09/18/98  | 09/21/98 |
| POTASSIUM, TOTAL    | 002 MS  | W   | 98L1203 | 08/10/98   | 09/18/98  | 09/21/98 |
| MAGNESIUM, TOTAL    | 002     | W   | 98L1203 | 08/10/98   | 09/18/98  | 09/21/98 |
| MAGNESIUM, TOTAL    | 002 REP | W   | 98L1203 | 08/10/98   | 09/18/98  | 09/21/98 |
| MAGNESIUM, TOTAL    | 002 MS  | W   | 98L1203 | 08/10/98   | 09/18/98  | 09/21/98 |
| MANGANESE, TOTAL    | 002     | W   | 98L1203 | 08/10/98   | 09/18/98  | 09/21/98 |
| MANGANESE, TOTAL    | 002 REP | W   | 98L1203 | 08/10/98   | 09/18/98  | 09/21/98 |
| MANGANESE, TOTAL    | 002 MS  | W   | 98L1203 | 08/10/98   | 09/18/98  | 09/21/98 |
| SODIUM, TOTAL       | 002     | W   | 98L1203 | 08/10/98   | 09/18/98  | 09/21/98 |
| SODIUM, TOTAL       | 002 REP | W   | 98L1203 | 08/10/98   | 09/18/98  | 09/21/98 |

Recra LabNet - Lionville Laboratory  
INORGANIC ANALYTICAL DATA PACKAGE FOR  
TNU-HANFORD B98-060

DATE RECEIVED: 08/15/98

RFW LOT # :9808L339

| CLIENT ID /ANALYSIS | RFW #   | MTX | PREP #  | COLLECTION | EXTR/PREP | ANALYSIS |
|---------------------|---------|-----|---------|------------|-----------|----------|
| SODIUM, TOTAL       | 002 MS  | W   | 98L1203 | 08/10/98   | 09/18/98  | 09/21/98 |
| NICKEL, TOTAL       | 002     | W   | 98L1203 | 08/10/98   | 09/18/98  | 09/21/98 |
| NICKEL, TOTAL       | 002 REP | W   | 98L1203 | 08/10/98   | 09/18/98  | 09/21/98 |
| NICKEL, TOTAL       | 002 MS  | W   | 98L1203 | 08/10/98   | 09/18/98  | 09/21/98 |
| LEAD, TOTAL         | 002     | W   | 98L1203 | 08/10/98   | 09/18/98  | 09/21/98 |
| LEAD, TOTAL         | 002 REP | W   | 98L1203 | 08/10/98   | 09/18/98  | 09/21/98 |
| LEAD, TOTAL         | 002 MS  | W   | 98L1203 | 08/10/98   | 09/18/98  | 09/21/98 |
| ANTIMONY, TOTAL     | 002     | W   | 98L1203 | 08/10/98   | 09/18/98  | 09/21/98 |
| ANTIMONY, TOTAL     | 002 REP | W   | 98L1203 | 08/10/98   | 09/18/98  | 09/21/98 |
| ANTIMONY, TOTAL     | 002 MS  | W   | 98L1203 | 08/10/98   | 09/18/98  | 09/21/98 |
| SELENIUM, TOTAL     | 002     | W   | 98L1203 | 08/10/98   | 09/18/98  | 09/21/98 |
| SELENIUM, TOTAL     | 002 REP | W   | 98L1203 | 08/10/98   | 09/18/98  | 09/21/98 |
| SELENIUM, TOTAL     | 002 MS  | W   | 98L1203 | 08/10/98   | 09/18/98  | 09/21/98 |
| THALLIUM, TOTAL     | 002     | W   | 98L1203 | 08/10/98   | 09/18/98  | 09/21/98 |
| THALLIUM, TOTAL     | 002 REP | W   | 98L1203 | 08/10/98   | 09/18/98  | 09/21/98 |
| THALLIUM, TOTAL     | 002 MS  | W   | 98L1203 | 08/10/98   | 09/18/98  | 09/21/98 |
| VANADIUM, TOTAL     | 002     | W   | 98L1203 | 08/10/98   | 09/18/98  | 09/21/98 |
| VANADIUM, TOTAL     | 002 REP | W   | 98L1203 | 08/10/98   | 09/18/98  | 09/21/98 |
| VANADIUM, TOTAL     | 002 MS  | W   | 98L1203 | 08/10/98   | 09/18/98  | 09/21/98 |
| ZINC, TOTAL         | 002     | W   | 98L1203 | 08/10/98   | 09/18/98  | 09/21/98 |
| ZINC, TOTAL         | 002 REP | W   | 98L1203 | 08/10/98   | 09/18/98  | 09/21/98 |
| ZINC, TOTAL         | 002 MS  | W   | 98L1203 | 08/10/98   | 09/18/98  | 09/21/98 |

BOPPC3

|                  |     |   |         |          |          |          |
|------------------|-----|---|---------|----------|----------|----------|
| SILVER, TOTAL    | 003 | W | 98L1203 | 08/10/98 | 09/18/98 | 09/21/98 |
| ALUMINUM, TOTAL  | 003 | W | 98L1203 | 08/10/98 | 09/18/98 | 09/21/98 |
| ARSENIC, TOTAL   | 003 | W | 98L1203 | 08/10/98 | 09/18/98 | 09/21/98 |
| BARIUM, TOTAL    | 003 | W | 98L1203 | 08/10/98 | 09/18/98 | 09/21/98 |
| BERYLLIUM, TOTAL | 003 | W | 98L1203 | 08/10/98 | 09/18/98 | 09/21/98 |
| CALCIUM, TOTAL   | 003 | W | 98L1203 | 08/10/98 | 09/18/98 | 09/21/98 |
| CADMIUM, TOTAL   | 003 | W | 98L1203 | 08/10/98 | 09/18/98 | 09/21/98 |
| COBALT, TOTAL    | 003 | W | 98L1203 | 08/10/98 | 09/18/98 | 09/21/98 |
| CHROMIUM, TOTAL  | 003 | W | 98L1203 | 08/10/98 | 09/18/98 | 09/21/98 |
| COPPER, TOTAL    | 003 | W | 98L1203 | 08/10/98 | 09/18/98 | 09/21/98 |
| IRON, TOTAL      | 003 | W | 98L1203 | 08/10/98 | 09/18/98 | 09/21/98 |
| MERCURY, TOTAL   | 003 | W | 98C0429 | 08/10/98 | 09/03/98 | 09/03/98 |
| POTASSIUM, TOTAL | 003 | W | 98L1203 | 08/10/98 | 09/18/98 | 09/21/98 |

Recra LabNet - Lionville Laboratory  
INORGANIC ANALYTICAL DATA PACKAGE FOR  
TNU-HANFORD B98-060

DATE RECEIVED: 08/15/98

RFW LOT # :9808L339

| CLIENT ID /ANALYSIS | RFW # | MTX | PREP #  | COLLECTION | EXTR/PREP | ANALYSIS |
|---------------------|-------|-----|---------|------------|-----------|----------|
| MAGNESIUM, TOTAL    | 003   | W   | 98L1203 | 08/10/98   | 09/18/98  | 09/21/98 |
| MANGANESE, TOTAL    | 003   | W   | 98L1203 | 08/10/98   | 09/18/98  | 09/21/98 |
| SODIUM, TOTAL       | 003   | W   | 98L1203 | 08/10/98   | 09/18/98  | 09/21/98 |
| NICKEL, TOTAL       | 003   | W   | 98L1203 | 08/10/98   | 09/18/98  | 09/21/98 |
| LEAD, TOTAL         | 003   | W   | 98L1203 | 08/10/98   | 09/18/98  | 09/21/98 |
| ANTIMONY, TOTAL     | 003   | W   | 98L1203 | 08/10/98   | 09/18/98  | 09/21/98 |
| SELENIUM, TOTAL     | 003   | W   | 98L1203 | 08/10/98   | 09/18/98  | 09/21/98 |
| THALLIUM, TOTAL     | 003   | W   | 98L1203 | 08/10/98   | 09/18/98  | 09/21/98 |
| VANADIUM, TOTAL     | 003   | W   | 98L1203 | 08/10/98   | 09/18/98  | 09/21/98 |
| ZINC, TOTAL         | 003   | W   | 98L1203 | 08/10/98   | 09/18/98  | 09/21/98 |

LAB QC:

|                      |        |   |         |     |          |          |
|----------------------|--------|---|---------|-----|----------|----------|
| SILVER LABORATORY    | LC1 BS | W | 98L1203 | N/A | 09/18/98 | 09/21/98 |
| SILVER, TOTAL        | MB1    | W | 98L1203 | N/A | 09/18/98 | 09/21/98 |
| ALUMINUM LABORTORY   | LC1 BS | W | 98L1203 | N/A | 09/18/98 | 09/21/98 |
| ALUMINUM, TOTAL      | MB1    | W | 98L1203 | N/A | 09/18/98 | 09/21/98 |
| ARSENIC LABORATORY   | LC1 BS | W | 98L1203 | N/A | 09/18/98 | 09/21/98 |
| ARSENIC, TOTAL       | MB1    | W | 98L1203 | N/A | 09/18/98 | 09/21/98 |
| BARIUM LABORATORY    | LC1 BS | W | 98L1203 | N/A | 09/18/98 | 09/21/98 |
| BARIUM, TOTAL        | MB1    | W | 98L1203 | N/A | 09/18/98 | 09/21/98 |
| BERYLLIUM LABORATORY | LC1 BS | W | 98L1203 | N/A | 09/18/98 | 09/21/98 |
| BERYLLIUM, TOTAL     | MB1    | W | 98L1203 | N/A | 09/18/98 | 09/21/98 |
| CALCIUM LABORATORY   | LC1 BS | W | 98L1203 | N/A | 09/18/98 | 09/21/98 |
| CALCIUM, TOTAL       | MB1    | W | 98L1203 | N/A | 09/18/98 | 09/21/98 |
| CADMIUM LABORATORY   | LC1 BS | W | 98L1203 | N/A | 09/18/98 | 09/21/98 |
| CADMIUM, TOTAL       | MB1    | W | 98L1203 | N/A | 09/18/98 | 09/21/98 |
| COBALT LABORATORY    | LC1 BS | W | 98L1203 | N/A | 09/18/98 | 09/21/98 |
| COBALT, TOTAL        | MB1    | W | 98L1203 | N/A | 09/18/98 | 09/21/98 |
| CHROMIUM LABORATORY  | LC1 BS | W | 98L1203 | N/A | 09/18/98 | 09/21/98 |
| CHROMIUM, TOTAL      | MB1    | W | 98L1203 | N/A | 09/18/98 | 09/21/98 |
| COPPER LABORATORY    | LC1 BS | W | 98L1203 | N/A | 09/18/98 | 09/21/98 |
| COPPER, TOTAL        | MB1    | W | 98L1203 | N/A | 09/18/98 | 09/21/98 |
| IRON LABORATORY      | LC1 BS | W | 98L1203 | N/A | 09/18/98 | 09/21/98 |
| IRON, TOTAL          | MB1    | W | 98L1203 | N/A | 09/18/98 | 09/21/98 |
| MERCURY LABORATORY   | LC1 BS | W | 98C0429 | N/A | 09/03/98 | 09/03/98 |
| MERCURY, TOTAL       | MB1    | W | 98C0429 | N/A | 09/03/98 | 09/03/98 |
| POTASSIUM LABORATORY | LC1 BS | W | 98L1203 | N/A | 09/18/98 | 09/21/98 |

Recra LabNet - Lionville Laboratory  
INORGANIC ANALYTICAL DATA PACKAGE FOR  
TNU-HANFORD B98-060

DATE RECEIVED: 08/15/98

RFW LOT # :9808L339

| CLIENT ID /ANALYSIS  | RFW #  | MTX | PREP #  | COLLECTION | EXTR/PREP | ANALYSIS |
|----------------------|--------|-----|---------|------------|-----------|----------|
| POTASSIUM, TOTAL     | MB1    | W   | 98L1203 | N/A        | 09/18/98  | 09/21/98 |
| MAGNESIUM LABORATORY | LC1 BS | W   | 98L1203 | N/A        | 09/18/98  | 09/21/98 |
| MAGNESIUM, TOTAL     | MB1    | W   | 98L1203 | N/A        | 09/18/98  | 09/21/98 |
| MANGANESE LABORATORY | LC1 BS | W   | 98L1203 | N/A        | 09/18/98  | 09/21/98 |
| MANGANESE, TOTAL     | MB1    | W   | 98L1203 | N/A        | 09/18/98  | 09/21/98 |
| SODIUM LABORATORY    | LC1 BS | W   | 98L1203 | N/A        | 09/18/98  | 09/21/98 |
| SODIUM, TOTAL        | MB1    | W   | 98L1203 | N/A        | 09/18/98  | 09/21/98 |
| NICKEL LABORATORY    | LC1 BS | W   | 98L1203 | N/A        | 09/18/98  | 09/21/98 |
| NICKEL, TOTAL        | MB1    | W   | 98L1203 | N/A        | 09/18/98  | 09/21/98 |
| LEAD LABORATORY      | LC1 BS | W   | 98L1203 | N/A        | 09/18/98  | 09/21/98 |
| LEAD, TOTAL          | MB1    | W   | 98L1203 | N/A        | 09/18/98  | 09/21/98 |
| ANTIMONY LABORATORY  | LC1 BS | W   | 98L1203 | N/A        | 09/18/98  | 09/21/98 |
| ANTIMONY, TOTAL      | MB1    | W   | 98L1203 | N/A        | 09/18/98  | 09/21/98 |
| SELENIUM LABORATORY  | LC1 BS | W   | 98L1203 | N/A        | 09/18/98  | 09/21/98 |
| SELENIUM, TOTAL      | MB1    | W   | 98L1203 | N/A        | 09/18/98  | 09/21/98 |
| THALLIUM LABORATORY  | LC1 BS | W   | 98L1203 | N/A        | 09/18/98  | 09/21/98 |
| THALLIUM, TOTAL      | MB1    | W   | 98L1203 | N/A        | 09/18/98  | 09/21/98 |
| VANADIUM LABORATORY  | LC1 BS | W   | 98L1203 | N/A        | 09/18/98  | 09/21/98 |
| VANADIUM, TOTAL      | MB1    | W   | 98L1203 | N/A        | 09/18/98  | 09/21/98 |
| ZINC LABORATORY      | LC1 BS | W   | 98L1203 | N/A        | 09/18/98  | 09/21/98 |
| ZINC, TOTAL          | MB1    | W   | 98L1203 | N/A        | 09/18/98  | 09/21/98 |

**FIELD PERSONNEL: COMPLETE ONLY SHADED AREAS**

[illegible]

**Special Instructions:**

**DATE/REVISIONS:**

\* Analyst must pick a sample + run matrix QC \*

1 SAF# - B98-000

2

3 INE(1) = ICCL, ICFL, ICNO2, ICNO3,

4 ICNO4

5

6

**RECRA LabNet Use Only**

Samples were

1) Shipped ☒ or  
Hand Delivered ☐

Airbill # \*

2) Ambient or Chilled ☒

3) Received in Good  
Condition ☒ or ☐

4) Labels Indicate  
Properly Preserved  
☒ or ☐

5) Received Within  
Holding Time ☒

COC Tape was

1) Present on Outer Package Y or N

2) Unbroken on Outer Package Y or N

3) Present on Sample Y or N

4) Unbroken on Sample Y or N

COC Record Present Upon Sample Rec'd Y or N

Order Form 1-8

| Relinquished by | Received by | Date    | Time |
|-----------------|-------------|---------|------|
| 2ed ex          | Y. J. L. L. | 8/15/98 | 0930 |
|                 |             |         |      |
|                 |             |         |      |

Discrepancies Between  
Samples Labels and  
COC Record? Y or **(N)**  
NOTES  
\* 423571515733

|   |  |   |  |                                    |  |                                  |  |  |  |             |  |
|---|--|---|--|------------------------------------|--|----------------------------------|--|--|--|-------------|--|
| Bechtel Hanford Inc.  |  | <b>CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST</b> |  |                                    |  |                                  |  | B98-060-09                                   |  | Page 1 of 1 |  |
| Collector<br>Doug Bryant  |  | Company Contact<br>Michael Gulgoul              |  | Telephone No.<br>373-3681          |  | Project Coordinator<br>WEISS, RL |  | <b>Data Turnaround</b><br><br><b>45 Days</b> |  |             |  |
| Project Designation<br>202-S Building - Plutonium Loadout Hood - Other Liquid         |  | Sampling Location<br>200 West                   |  | SAF No.<br>B98-060                 |  |                                  |  |  |  |             |  |
| Ice Chest No.   |  | Field Logbook No.<br>EL-1429                    |  | Method of Shipment<br>Hand deliver |  |                                  |  |  |  |             |  |
| Shipped To<br>TMA/RECRA Lab Net<br>RF   |  | Offsite Property No.                            |  | Bill of Lading/Air Bill No.        |  |                                  |  |  |  |             |  |
| Waste Designation      Client determined no waste codes associated with this project. |  |   |  | COA                                |  |                                  |  |  |  |             |  |

| POSSIBLE SAMPLE HAZARDS/REMARKS | Preservation                               | HNO3<br><del>None</del><br>RF | HNO3<br><del>None</del><br>RF | HNO3 | Cool 4C | Cool 4C | HNO3<br><del>None</del><br>RF | None  | Cool 4C | HNO3<br><del>None</del><br>RF |
|---------------------------------|--|-------------------------------|-------------------------------|------|---------|---------|-------------------------------|-------|---------|-------------------------------|
|                                 | Type of Container                          | aG                            | aG                            | aG   | aG      | aG      | aG                            | aG    | aGs*    | aG                            |
|                                 | No. of Container(s)                        | 1                             | 1                             | 1    | 1       | 1       | 1                             | 1     | 3       | 3                             |
|                                 | Special Handling and/or Storage<br>Cool 4C | Volume                        | 20mL                          | 20mL | 125mL   | 250mL   | 250mL                         | 250mL | 250mL   | 40mL                          |

| SAMPLE ANALYSIS | See item (1) in Special Instructions. | Gross Alpha; Gross Beta | Mercury - 7471 - (CV) | IC Anions - 300.0; IC Anions - 300.0 Add On | PCBs - 8080 | ICP Metals - 6010A (SW-846); ICP Metals - 6010A (Add-on) (Lead) | pH (Water) - 9040 | VOA - 8260A (TCL) | See item (2) in Special Instructions. |
|-----------------|---------------------------------------|-------------------------|-----------------------|---|-------------|---|-------------------|-------------------|---------------------------------------|
|-----------------|---------------------------------------|-------------------------|-----------------------|---|-------------|---|-------------------|-------------------|---------------------------------------|

| Sample No. | Matrix *     | Sample Date | Sample Time |  |  |   |   |   |   |   |
|------------|--------------|-------------|-------------|--|--|---|---|---|---|---|
| BOPPC1     | Other Liquid | 8.10.98     | 1500        |  |  | X | X | X | X | X |
| BOPPC2     | Other Liquid | 8.10.98     | 1505        |  |  | X | X | X | X | X |
| BOPPC3     | Other Liquid | 8.10.98     | 1520        |  |  | X | X | X | X | X |
|            |              |             |             |  |  |   |   |   |   |   |
|            |              |             |             |  |  |   |   |   |   |   |

| CHAIN OF POSSESSION                         | Sign/Print Names          |                       | SPECIAL INSTRUCTIONS |
|---|---------------------------|-----------------------|----------------------|
| Relinquished By<br>R. Feldman for D. Bryant | Date/Time<br>8.14.98 1700 | Received By<br>Fed Ex | Date/Time<br>1300    |
| Relinquished By                             | Date/Time                 | Received By           | Date/Time            |
| Relinquished By                             | Date/Time                 | Received By           | Date/Time            |
| Relinquished By                             | Date/Time                 | Received By           | Date/Time            |

**LABORATORY SECTION**

Received By \_\_\_\_\_ Title \_\_\_\_\_

**FINAL SAMPLE DISPOSITION**

Disposal Method \_\_\_\_\_ Disposed By \_\_\_\_\_ Date/Time \_\_\_\_\_

**Matrix \***

- S - Soil
- SE - Sediment
- SO - Solid
- SL - Sludge
- W - Water
- O - Oil
- A - Air
- DS - Drum Solids
- DL - Drum Liquids
- T - Tissue
- WI - Wipe
- L - Liquid
- V - Vegetation
- X - Other

**SPECIAL INSTRUCTIONS**

\*\* The laboratory will hold samples until notified by ERG Sample and Data Management to begin analysis, unless holding times are in jeopardy.

(1) Americium-241/Curium-244; Neptunium-237; Gadolinium-153; Europium-154; Plutonium-239; Americium-241; Antimony-125; Cerium-134; Radium-226; Radium-228

(2) Gamma Spectroscopy (Cerium-137, Cobalt-60, Europium-152, Europium-154, Gadolinium-153); Gamma Spec - Add on (Americium-241, Antimony-125, Cerium-134, Radium-226, Radium-228)

4235 7951 5933      6.8

019

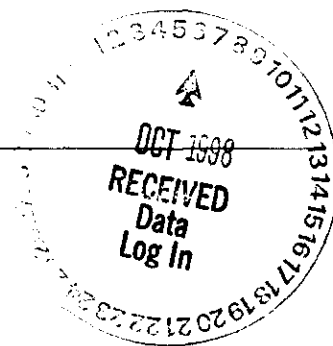


**RECRA  
LabNet**

*a division of Recra Environmental, Inc.*

*Virtual Laboratories Everywhere*

**Recra LabNet Philadelphia  
Analytical Report**

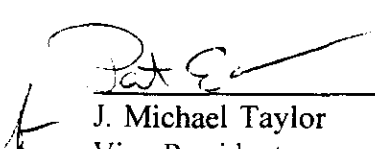


**Client :** TNU-HANFORD B98-060  
**RFW# :** 9808L339  
**SDG# :** H0198  
**SAF# :** B98-060

**W.O. # :** 10985-001-001-9999-00  
**Date Received:** 08-15-98

**INORGANIC CASE NARRATIVE**

1. This narrative covers the analyses of 3 water samples.
2. The samples were prepared and analyzed in accordance with the methods checked on the attached glossary.
3. Sample holding times as required by the method and/or contract were met with the exception of pH, Nitrate and Nitrite which were received past hold.
4. The cooler temperature was recorded on the chain-of-custody.
5. The method blanks were within method criteria.
6. The Laboratory Control Samples (LCS) were within the laboratory control limits.
7. The matrix spike recoveries were within the 75-125% control limits.
8. The replicate analyses were within the 20% Relative Percent Difference (RPD) control limit.

  
\_\_\_\_\_  
J. Michael Taylor  
Vice President  
Philadelphia Analytical Laboratory

9-23-98  
Date

njpi08-339

The results presented in this report relate only to the analytical testing and conditions of the samples at receipt and during storage. All pages of this report are integral parts of the analytical data. Therefore, this report should only be reproduced in its entirety of 11 pages.

# WET CHEMISTRY METHODS GLOSSARY FOR ANALYSIS OF WATER SAMPLES

|  | <u>EPA 600</u>                            | <u>SW846</u>      | <u>OTHER</u>               |
|--|---|-------------------|----------------------------|
| Acidity  | __ 305.1                                  |                   |                            |
| __ Alkalinity __ Bicarbonate __ Carbonate  | __ 310.1                                  |                   |                            |
| BOD  | __ 405.1                                  |                   | __ 5210B (b)               |
| Ion Chromatography:  |   |                   |                            |
| __ Bromide <input checked="" type="checkbox"/> Chloride <input checked="" type="checkbox"/> Fluoride | <input checked="" type="checkbox"/> 300.0 | __ 9056           |                            |
| <input checked="" type="checkbox"/> Nitrite <input checked="" type="checkbox"/> Nitrate __ Phosphate | <input checked="" type="checkbox"/> 300.0 | __ 9056           |                            |
| <input checked="" type="checkbox"/> Sulfate __ Formate __ Acetate __ Oxalate                         | <input checked="" type="checkbox"/> 300.0 | __ 9056           |                            |
| Chloride   | __ 325.2                                  | __ 9251           |                            |
| Chlorine Residual  | __ 330.5 (mod)                            |                   |                            |
| Cyanide Amenable to Chlorination   | __ 335.2                                  | __ 9010A          |                            |
| Cyanide (Total)  | __ 335.2                                  | __ 9010A __ 9012  | __ ILM04.0 (e)             |
| Cyanide, Weak Acid Dissociable   |   |                   | __ 412 (a) __ 4500CN-I (b) |
| COD  | __ 410.4 (mod)                            |                   | __ 5220 C (b)              |
| Color  | __ 110.2                                  |                   |                            |
| Corrosivity (by Coupon)  |   | __ 1110 (mod)     |                            |
| Chromium VI  |   | __ 7196A          | __ 3500Cr-D (b)            |
| Fluoride   | __ 340.2                                  |                   |                            |
| Hardness, Calcium  | __ 215.2                                  |                   |                            |
| Hardness, Total  | __ 130.2                                  |                   |                            |
| Iodide   |   |                   | __ ASTM D19P202 (1)        |
| Surfactant   | __ 425.1                                  |                   |                            |
| __ Nitrate-Nitrite __ Nitrate __ Nitrite   | __ 353.2                                  |                   |                            |
| Ammonia  | __ 350.3                                  |                   |                            |
| Total __ Kjeldahl Nitrogen __ Organic Nitrogen   | __ 351.4                                  |                   |                            |
| Total __ Organic __ Inorganic Carbon   | __ 415.1                                  | __ 9060           |                            |
| Oil and Grease   | __ 413.1                                  | __ 9070           |                            |
| <input checked="" type="checkbox"/> pH __ pH, Paper  | <input checked="" type="checkbox"/> 150.1 | __ 9040A __ 9041A |                            |
| Petroleum Hydrocarbons, Total Recoverable  | __ 418.1                                  |                   |                            |
| Phenol   | __ 420.1 __ 420.2                         | __ 9065 __ 9066   |                            |
| __ Ortho Phosphate __ Total Phosphate  | __ 365.2                                  |                   | __ 4500-P B __ C           |
| Salinity   |   |                   | __ 210A (a) __ 2520B (b)   |
| Settleable Solids  | __ 160.5                                  |                   |                            |
| Sulfide  | __ 376.2 __ 376.1                         | __ 9030A          |                            |
| Reactive __ Cyanide __ Sulfide   |   | __ Sec 7.3        |                            |
| Silica   | __ 370.1                                  |                   |                            |
| Sulfite  | __ 377.1                                  |                   |                            |
| Sulfate  | __ 375.4                                  | __ 9038           |                            |
| Specific Conductance   | __ 120.1                                  | __ 9050           |                            |
| Specific Gravity   |   |                   | __ 213E (a)                |
| __ TCLP __ TCLV  |   | __ 1311           |                            |
| Synthetic Precipitation Leach  |   | __ 1312           |                            |
| Total __ Dissolved __ Suspended __ Solids  | 160 __.1 __.2 __.3                        |                   |                            |
| Total Organic Halides  | __ 450.1                                  | __ 9020B          |                            |
| Turbidity  | __ 180.1                                  |                   |                            |
| Volatile Solids __ Total __ Dissolved __ Suspended   | __ 160.4                                  |                   |                            |
| Other: _____   | Method: _____                             |                   |                            |

# METHOD REFERENCES AND DATA QUALIFIERS

## DATA QUALIFIERS

U = Indicates that the parameter was not detected at or above the reported limit. The associated numerical value is the sample detection limit.

\* = Indicates that the original sample result is greater than 4x the spike amount added.

## ABBREVIATIONS

MB = Method or Preparation Blank.

MS = Matrix Spike.

MSD = Matrix Spike Duplicate.

REP = Sample Replicate

LC = Laboratory Control Sample.

NC = Not calculated.

A suffix of -R, -S, or -T following these codes indicate a replicate, spike or sample duplicate analysis respectively.

## ANALYTICAL WET CHEMISTRY METHODS

1. ASTM Standard Methods.
2. USEPA Methods for Chemical Analysis of Water and Wastes (USEPA 600/4-79-020).
3. Test Methods for Evaluating Solid Waste (USEPA SW-846).
  - a. Standard Methods for the Examination of Water and Waste, 16 ed., (1989).
  - b. Standard Methods for the Examination of Water and Waste, 17 ed., (1983)
  - c. Method of Soil Analysis, Part 1, Physical and Mineralogical Methods, 2nd. Ed. (1986)
  - d. Method of Soil Analysis, Part 2, Chemical and Microbiological Properties, Am. Soc. Agron., Madison, WI (1965)
  - e. USEPA Contract Laboratory Program, Statement of Work for Inorganic Analysis.
  - f. Code of Federal Regulations.

RFW 21-21L-034/D-06/96

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INORGANICS DATA SUMMARY REPORT 09/16/98

CLIENT: TNU-HANFORD B98-060  
WORK ORDER: 10985-001-001-9999-00

RECRA LOT #: 9808L339

| SAMPLE | SITE ID | ANALYTE        | RESULT | UNITS    | REPORTING<br>LIMIT | DILUTION<br>FACTOR |
|--------|---------|----------------|--------|----------|--------------------|--------------------|
| =====  | =====   | =====          | =====  | =====    | =====              | =====              |
| -001   | B0PPC1  | Chloride by IC | 0.54   | MG/L     | 0.25               | 1.0                |
|        |         | Fluoride by IC | 0.50 u | MG/L     | 0.50               | 1.0                |
|        |         | Nitrite by IC  | 0.25 u | MG/L     | 0.25               | 1.0                |
|        |         | Nitrate by IC  | 0.25 u | MG/L     | 0.25               | 1.0                |
|        |         | Sulfate by IC  | 0.25 u | MG/L     | 0.25               | 1.0                |
|        |         | pH             | 9.4    | PH UNITS | 0.01               | 1.0                |
| -002   | B0PPC2  | Chloride by IC | 0.25 u | MG/L     | 0.25               | 1.0                |
|        |         | Fluoride by IC | 0.50 u | MG/L     | 0.50               | 1.0                |
|        |         | Nitrite by IC  | 0.25 u | MG/L     | 0.25               | 1.0                |
|        |         | Nitrate by IC  | 0.25 u | MG/L     | 0.25               | 1.0                |
|        |         | Sulfate by IC  | 0.25 u | MG/L     | 0.25               | 1.0                |
|        |         | pH             | 7.7    | PH UNITS | 0.01               | 1.0                |
| -003   | B0PPC3  | Chloride by IC | 0.25 u | MG/L     | 0.25               | 1.0                |
|        |         | Fluoride by IC | 0.50 u | MG/L     | 0.50               | 1.0                |
|        |         | Nitrite by IC  | 0.25 u | MG/L     | 0.25               | 1.0                |
|        |         | Nitrate by IC  | 0.25 u | MG/L     | 0.25               | 1.0                |
|        |         | Sulfate by IC  | 0.25 u | MG/L     | 0.25               | 1.0                |
|        |         | pH             | 7.1    | PH UNITS | 0.01               | 1.0                |

Recra LabNet - Lionville

INORGANICS METHOD BLANK DATA SUMMARY PAGE 09/16/98

CLIENT: TNU-HANFORD B98-060

RECRA LOT #: 9808L339

WORK ORDER: 10985-001-001-9999-00

| SAMPLE  | SITE ID      | ANALYTE        | RESULT | UNITS | REPORTING<br>LIMIT | DILUTION<br>FACTOR |
|---------|--------------|----------------|--------|-------|--------------------|--------------------|
| *****   | *****        | *****          | *****  | ***** | *****              | *****              |
| BLANK10 | 98LICB65-MB1 | Chloride by IC | 0.25 u | MG/L  | 0.25               | 1.0                |
|         |              | Fluoride by IC | 0.50 u | MG/L  | 0.50               | 1.0                |
|         |              | Nitrite by IC  | 0.25 u | MG/L  | 0.25               | 1.0                |
|         |              | Nitrate by IC  | 0.25 u | MG/L  | 0.25               | 1.0                |
|         |              | Sulfate by IC  | 0.25 u | MG/L  | 0.25               | 1.0                |

Recra LabNet - Lionville

INORGANICS ACCURACY REPORT 09/16/98

CLIENT: TNU-HANFORD B98-060

RECRA LOT #: 9808L339

WORK ORDER: 10985-001-001-9999-00

| SAMPLE  | SITE ID      | ANALYTE        | SPIKED<br>SAMPLE | INITIAL<br>RESULT | SPIKED<br>AMOUNT | %RECOV | DILUTION<br>FACTOR (SPK) |
|---------|--------------|----------------|------------------|-------------------|------------------|--------|--------------------------|
| *****   | *****        | *****          | *****            | *****             | *****            | *****  | *****                    |
| -001    | B0PPC1       | Chloride by IC | 4.8              | 0.54              | 5.0              | 84.5   | 1.0                      |
|         |              | Fluoride by IC | 10.3             | 0.00              | 10.0             | 103.0  | 1.0                      |
|         |              | Nitrite by IC  | 4.9              | 0.25u             | 5.0              | 97.0   | 1.0                      |
|         |              | Nitrate by IC  | 5.2              | 0.25u             | 5.0              | 104.9  | 1.0                      |
|         |              | Sulfate by IC  | 5.0              | 0.25u             | 5.0              | 100.9  | 1.0                      |
| BLANK10 | 98LICB65-MB1 | Chloride by IC | 4.7              | 0.25u             | 5.0              | 93.8   | 1.0                      |
|         |              | Fluoride by IC | 10               | 0.50u             | 10.0             | 99.8   | 1.0                      |
|         |              | Nitrite by IC  | 5.0              | 0.25u             | 5.0              | 99.1   | 1.0                      |
|         |              | Nitrate by IC  | 4.8              | 0.25u             | 5.0              | 96.6   | 1.0                      |
|         |              | Sulfate by IC  | 4.8              | 0.25u             | 5.0              | 95.3   | 1.0                      |

Recra LabNet - Lionville

INORGANICS PRECISION REPORT 09/16/98

CLIENT: TNU-HANFORD B98-060

RECRA LOT #: 9808L339

WORK ORDER: 10985-001-001-9999-00

| SAMPLE  | SITE ID | ANALYTE        | INITIAL<br>RESULT | REPLICATE | RPD | DILUTION<br>FACTOR (REP) |
|---------|---------|----------------|-------------------|-----------|-----|--------------------------|
| -001REP | B0PPC1  | Chloride by IC | 0.54              | 0.25u     | NC  | 1.0                      |
|         |         | Fluoride by IC | 0.50u             | 0.50u     | NC  | 1.0                      |
|         |         | Nitrite by IC  | 0.25u             | 0.25u     | NC  | 1.0                      |
|         |         | Nitrate by IC  | 0.25u             | 0.25u     | NC  | 1.0                      |
|         |         | Sulfate by IC  | 0.25u             | 0.25u     | NC  | 1.0                      |
| -003REP | B0PPC3  | pH             | 7.1               | 6.9       | 3.3 | 1.0                      |

Recra LabNet - Lionville Laboratory  
INORGANIC ANALYTICAL DATA PACKAGE FOR  
TNU-HANFORD B98-060

DATE RECEIVED: 08/15/98

RFW LOT # :9808L339

| CLIENT ID /ANALYSIS | RFW # | MTX | PREP # | COLLECTION | EXTR/PREP | ANALYSIS |
|---------------------|-------|-----|--------|------------|-----------|----------|
|---------------------|-------|-----|--------|------------|-----------|----------|

BOPPC1

|                |         |   |          |          |          |          |
|----------------|---------|---|----------|----------|----------|----------|
| CHLORIDE BY IC | 001     | W | 98LICB65 | 08/10/98 | 08/31/98 | 08/31/98 |
| CHLORIDE BY IC | 001 REP | W | 98LICB65 | 08/10/98 | 08/31/98 | 08/31/98 |
| CHLORIDE BY IC | 001 MS  | W | 98LICB65 | 08/10/98 | 08/31/98 | 08/31/98 |
| FLUORIDE BY IC | 001     | W | 98LICB65 | 08/10/98 | 08/31/98 | 08/31/98 |
| FLUORIDE BY IC | 001 REP | W | 98LICB65 | 08/10/98 | 08/31/98 | 08/31/98 |
| FLUORIDE BY IC | 001 MS  | W | 98LICB65 | 08/10/98 | 08/31/98 | 08/31/98 |
| NITRITE BY IC  | 001     | W | 98LICB65 | 08/10/98 | 08/31/98 | 08/31/98 |
| NITRITE BY IC  | 001 REP | W | 98LICB65 | 08/10/98 | 08/31/98 | 08/31/98 |
| NITRITE BY IC  | 001 MS  | W | 98LICB65 | 08/10/98 | 08/31/98 | 08/31/98 |
| NITRATE BY IC  | 001     | W | 98LICB65 | 08/10/98 | 08/31/98 | 08/31/98 |
| NITRATE BY IC  | 001 REP | W | 98LICB65 | 08/10/98 | 08/31/98 | 08/31/98 |
| NITRATE BY IC  | 001 MS  | W | 98LICB65 | 08/10/98 | 08/31/98 | 08/31/98 |
| SULFATE BY IC  | 001     | W | 98LICB65 | 08/10/98 | 08/31/98 | 08/31/98 |
| SULFATE BY IC  | 001 REP | W | 98LICB65 | 08/10/98 | 08/31/98 | 08/31/98 |
| SULFATE BY IC  | 001 MS  | W | 98LICB65 | 08/10/98 | 08/31/98 | 08/31/98 |
| PH             | 001     | W | 98LPH092 | 08/10/98 | 08/19/98 | 08/19/98 |

BOPPC2

|                |     |   |          |          |          |          |
|----------------|-----|---|----------|----------|----------|----------|
| CHLORIDE BY IC | 002 | W | 98LICB65 | 08/10/98 | 08/31/98 | 08/31/98 |
| FLUORIDE BY IC | 002 | W | 98LICB65 | 08/10/98 | 08/31/98 | 08/31/98 |
| NITRITE BY IC  | 002 | W | 98LICB65 | 08/10/98 | 08/31/98 | 08/31/98 |
| NITRATE BY IC  | 002 | W | 98LICB65 | 08/10/98 | 08/31/98 | 08/31/98 |
| SULFATE BY IC  | 002 | W | 98LICB65 | 08/10/98 | 08/31/98 | 08/31/98 |
| PH             | 002 | W | 98LPH092 | 08/10/98 | 08/19/98 | 08/19/98 |

BOPPC3

|                |         |   |          |          |          |          |
|----------------|---------|---|----------|----------|----------|----------|
| CHLORIDE BY IC | 003     | W | 98LICB65 | 08/10/98 | 08/31/98 | 08/31/98 |
| FLUORIDE BY IC | 003     | W | 98LICB65 | 08/10/98 | 08/31/98 | 08/31/98 |
| NITRITE BY IC  | 003     | W | 98LICB65 | 08/10/98 | 08/31/98 | 08/31/98 |
| NITRATE BY IC  | 003     | W | 98LICB65 | 08/10/98 | 08/31/98 | 08/31/98 |
| SULFATE BY IC  | 003     | W | 98LICB65 | 08/10/98 | 08/31/98 | 08/31/98 |
| PH             | 003     | W | 98LPH092 | 08/10/98 | 08/19/98 | 08/19/98 |
| PH             | 003 REP | W | 98LPH092 | 08/10/98 | 08/19/98 | 08/19/98 |

LAB QC:

Recra LabNet - Lionville Laboratory  
INORGANIC ANALYTICAL DATA PACKAGE FOR  
TNU-HANFORD B98-060

DATE RECEIVED: 08/15/98

RFW LOT # :9808L339

| CLIENT ID /ANALYSIS | RFW #  | MTX | PREP #   | COLLECTION | EXTR/PREP | ANALYSIS |
|---------------------|--------|-----|----------|------------|-----------|----------|
| CHLORIDE BY IC      | MB1    | W   | 98LICB65 | N/A        | 08/31/98  | 08/31/98 |
| CHLORIDE BY IC      | MB1 BS | W   | 98LICB65 | N/A        | 08/31/98  | 08/31/98 |
| FLUORIDE BY IC      | MB1    | W   | 98LICB65 | N/A        | 08/31/98  | 08/31/98 |
| FLUORIDE BY IC      | MB1 BS | W   | 98LICB65 | N/A        | 08/31/98  | 08/31/98 |
| NITRITE BY IC       | MB1    | W   | 98LICB65 | N/A        | 08/31/98  | 08/31/98 |
| NITRITE BY IC       | MB1 BS | W   | 98LICB65 | N/A        | 08/31/98  | 08/31/98 |
| NITRATE BY IC       | MB1    | W   | 98LICB65 | N/A        | 08/31/98  | 08/31/98 |
| NITRATE BY IC       | MB1 BS | W   | 98LICB65 | N/A        | 08/31/98  | 08/31/98 |
| SULFATE BY IC       | MB1    | W   | 98LICB65 | N/A        | 08/31/98  | 08/31/98 |
| SULFATE BY IC       | MB1 BS | W   | 98LICB65 | N/A        | 08/31/98  | 08/31/98 |

## Custody Transfer Record/Lab Work Request Page 1 of 1



9808L339

FIELD PERSONNEL: COMPLETE ONLY SHADED AREAS

|   |  |  |  |                    |  |         |  |     |  |     |  |          |  |          |  |
|---|--|--|--|--------------------|--|---------|--|-----|--|-----|--|----------|--|----------|--|
| Client <i>TNU - Hanford B98-060</i>               |  |  |  | Refrigerator #     |  | 1       |  | 3   |  | 3   |  | 3        |  | 3        |  |
| Est. Final Proj. Sampling Date                    |  |  |  | #/Type Container   |  | Liquid  |  | 30g |  | 1g  |  | 3g       |  | 1g       |  |
| Project # <i>10985-001-001-9999-00</i>            |  |  |  |                    |  | Solid   |  |     |  |     |  |          |  |          |  |
| Project Contact/Phone #                           |  |  |  | Volume             |  | Liquid  |  | 40  |  | 250 |  | 115/250  |  | 250 250  |  |
| RECRA Project Manager <i>MS</i>                   |  |  |  |                    |  | Solid   |  |     |  |     |  |          |  |          |  |
| QC <i>SPEC</i> Del <i>STD</i> TAT <i>30 day</i>   |  |  |  | Preservatives      |  |         |  | -   |  | -   |  | HNO3     |  | -        |  |
| Date Rec'd <i>8/15/98</i> Date Due <i>9/14/98</i> |  |  |  | ANALYSES REQUESTED |  | ORGANIC |  | VOA |  | BNA |  | Pest/PCB |  | Herb     |  |
| Account # <i>TNU - HANFORD</i>                    |  |  |  |                    |  |         |  |     |  |     |  |          |  | INORG    |  |
|   |  |  |  |                    |  |         |  |     |  |     |  |          |  | Metal CN |  |
|   |  |  |  |                    |  |         |  |     |  |     |  |          |  | Anion    |  |
| MATRIX CODES:                                     |  |  |  |                    |  |         |  |     |  |     |  |          |  |          |  |
| S - Soil  |  |  |  |                    |  |         |  |     |  |     |  |          |  |          |  |
| SE - Sediment                                     |  |  |  |                    |  |         |  |     |  |     |  |          |  |          |  |
| SO - Solid  |  |  |  |                    |  |         |  |     |  |     |  |          |  |          |  |
| SL - Sludge                                       |  |  |  |                    |  |         |  |     |  |     |  |          |  |          |  |
| W - Water   |  |  |  |                    |  |         |  |     |  |     |  |          |  |          |  |
| O - Oil   |  |  |  |                    |  |         |  |     |  |     |  |          |  |          |  |
| A - Air   |  |  |  |                    |  |         |  |     |  |     |  |          |  |          |  |
| DS - Drum Solids                                  |  |  |  |                    |  |         |  |     |  |     |  |          |  |          |  |
| DL - Drum Liquids                                 |  |  |  |                    |  |         |  |     |  |     |  |          |  |          |  |
| L - EP/TCLP Leachate                              |  |  |  |                    |  |         |  |     |  |     |  |          |  |          |  |
| WI - Wipe   |  |  |  |                    |  |         |  |     |  |     |  |          |  |          |  |
| X - Other   |  |  |  |                    |  |         |  |     |  |     |  |          |  |          |  |
| F - Fish  |  |  |  |                    |  |         |  |     |  |     |  |          |  |          |  |

Special Instructions:

DATE/REVISIONS:

\* Analyst must pick a sample + run matrix QC \*

1. SAF # - B98-060
- 2.
3. INEQ = ICCL, ICFL, ICNO2, ICNO3, ICNO4
- 4.
- 5.
- 6.

RECRA LabNet Use Only

|                                       |        |                                     |        |
|---------------------------------------|--------|-------------------------------------|--------|
| Samples were                          |        | COC Tape was                        |        |
| 1) Shipped                            | or     | 1) Present on Outer Package         | Y or N |
| Hand Delivered                        |        | 2) Unbroken on Outer Package        | Y or N |
| Airbill # *                           |        | 3) Preserved Sample                 | Y or N |
| 2) Ambient or Chilled                 |        | 4) Unbroken on Sample               | Y or N |
| 3) Received in Good Condition         | Y or N | COC Record Present Upon Sample Hand | Y or N |
| 4) Labels Indicate Properly Preserved | Y or N | COC Record Present Upon Sample Hand | Y or N |
| 5) Received Within Holding Time       | Y or N | COC Record Present Upon Sample Hand | Y or N |

| Relinquished by | Received by     | Date           | Time        | Relinquished by | Received by | Date | Time |
|-----------------|-----------------|----------------|-------------|-----------------|-------------|------|------|
| <i>2ed ex</i>   | <i>Y. Allen</i> | <i>8/15/98</i> | <i>0930</i> |                 |             |      |      |

Discrepancies Between Samples Labels and COC Record? Y or N

NOTES

\* 1735 8/15/98

|   |  |   |  |                                    |  |                                  |            |                |             |  |
|---|--|---|--|------------------------------------|--|----------------------------------|------------|----------------|-------------|--|
| Bechtel Hanford Inc.  |  | <b>CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST</b> |  |                                    |  |                                  | B98-060-09 |                | Page 1 of 1 |  |
| Collector<br>Doug Bryant  |  | Company Contact<br>Michael Gulgoul              |  | Telephone No.<br>373-5681          |  | Project Coordinator<br>WEISS, RL |            | <b>45 Days</b> |             |  |
| Project Designation<br>202-S Building - Plutonium Loadout Hood - Other Liquid         |  | Sampling Location<br>200 West                   |  |                                    |  | SAF No.<br>B98-060               |            |                |             |  |
| Ice Chest No.   |  | Field Logbook No.<br>EL-1429                    |  | Method of Shipment<br>Hand deliver |  |                                  |            |                |             |  |
| Shipped To<br>TMA/RECRA Lab Net<br>RF   |  | Offsite Property No.                            |  | Bill of Lading/Air Bill No.        |  |                                  |            |                |             |  |
| Waste Designation      Client determined no waste codes associated with this project. |  |   |  | COA                                |  |                                  |            |                |             |  |

| POSSIBLE SAMPLE HAZARDS/REMARKS            | Preservation        | HNO <sub>3</sub><br><del>None</del><br>RF | HNO <sub>3</sub><br><del>None</del><br>RF | HNO <sub>3</sub> | Cool 4C | Cool 4C | HNO <sub>3</sub><br><del>None</del><br>RF | None  | Cool 4C | HNO <sub>3</sub><br><del>None</del><br>RF |
|--|---------------------|---|---|------------------|---------|---------|---|-------|---------|---|
|  | Type of Container   | aG  | aG  | aG               | aG      | aG      | aG  | aG    | aGs*    | aG  |
|  | No. of Container(s) | 1   | 1   | 1                | 1       | 1       | 1   | 1     | 3       | 3   |
| Special Handling and/or Storage<br>Cool 4C | Volume              | 20mL                                      | 20mL                                      | 125mL            | 250mL   | 250mL   | 250mL                                     | 250mL | 40mL    | 500mL                                     |

| SAMPLE ANALYSIS |              |             |             | See item (1) in Special Instructions. | Gross Alpha, Gross Beta | Mercury - 7471 - (CV) | IC Anions - 300.0; IC Anions - 300.0 Add On | PCBs - 8080 | ICP Metals - 6010A (SW-B46), ICP Metals - 6010A (Add-on) (Lead) | pH (Water) - 9040 | VOA - 8260A (TCL) | See item (2) in Special Instructions. |
|-----------------|--------------|-------------|-------------|---------------------------------------|-------------------------|-----------------------|---|-------------|---|-------------------|-------------------|---------------------------------------|
| Sample No.      | Matrix *     | Sample Date | Sample Time |                                       |                         |                       |   |             |   |                   |                   |                                       |
| BOPPC1          | Other Liquid | 8.10.98     | 1500        |                                       |                         | X                     | X   | X           | X   | X                 | X                 |                                       |
| BOPPC2          | Other Liquid | 8.10.98     | 1505        |                                       |                         | X                     | X   | X           | X   | X                 | X                 |                                       |
| BOPPC3          | Other Liquid | 8.10.98     | 1520        |                                       |                         | X                     | X   | X           | X   | X                 | X                 |                                       |
|                 |              |             |             |                                       |                         |                       |   |             |   |                   |                   |                                       |
|                 |              |             |             |                                       |                         |                       |   |             |   |                   |                   |                                       |

| CHAIN OF POSSESSION                         | Sign/Print Names          |                       | SPECIAL INSTRUCTIONS | Matrix *   |
|---|---------------------------|-----------------------|----------------------|--|
| Relinquished By<br>R. Feldman for D. Bryant | Date/Time<br>8.14.98 1300 | Received By<br>Fed Ex | Date/Time<br>1300    | S - Soil<br>SE - Sediment<br>SO - Solid<br>SL - Sludge<br>W - Water<br>O - Oil<br>A - Air<br>DS - Drum Solids<br>DL - Drum Liquids<br>T - Tissue<br>WI - Wipe<br>L - Liquid<br>V - Vegetation<br>X - Other |
| Relinquished By                             | Date/Time                 | Received By           | Date/Time            |  |
| Relinquished By                             | Date/Time                 | Received By           | Date/Time            |  |
| Relinquished By                             | Date/Time                 | Received By           | Date/Time            |  |

**LABORATORY SECTION**      Received By \_\_\_\_\_ Title \_\_\_\_\_ Date/Time \_\_\_\_\_

**FINAL SAMPLE DISPOSITION**      Disposal Method \_\_\_\_\_ Disposed By \_\_\_\_\_ Date/Time \_\_\_\_\_

**SPECIAL INSTRUCTIONS**

\*\* The laboratory will hold samples until notified by ERG Sample and Data Management to begin analysis, unless holding times are in jeopardy.

RF 8.14.98

(1) Americium-241/Curium-244, Neptunium-237, Strontium-89,90 - Sr-90, Isotopic Plutonium

(2) Gamma Spectroscopy (Cesium-137, Cobalt-60, Europium-152, Europium-154, Europium-155); Gamma Spec - Add-on (Americium-241, Antimony-125, Cesium-134, Radium-226, Radium-228)

4235 7951 5933      6.8



**RECRA  
LabNet**

a division of Recra Environmental, Inc.

Virtual Laboratories Everywhere

**Recra LabNet Philadelphia  
Analytical Report**

**Client :** TNU-HANFORD  
**RFW# :** 9808L339  
**SDG/SAF:** H0198/B98-060

**W.O.# :** 10985-001-001-9999-00  
**Date Received :** 08-15-98

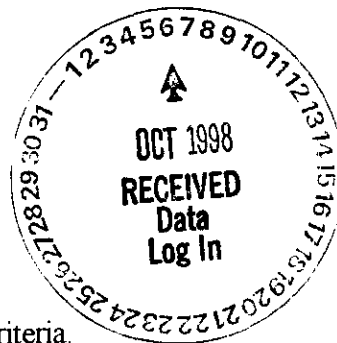
**PCB**

The set of samples consisted of three (3) water samples collected on 08-10-98.

The samples and their associated QC samples were extracted on 08-17-98 and analyzed on 08-21,22-98 according to Recra OPs based on SW846, 3rd Edition, Method 3520 and Method 8081.

The following is a summary of the QC results accompanying the sample results and a description of any problems encountered during their analyses:

1. The cooler temperature upon receipt has been recorded on the chain-of-custody.
2. All required holding times for extraction and analysis have been met.
3. The samples and their associated QC samples received a sulfuric acid and sulfur cleanup.
4. The method blank was below the reporting limits for all target compounds.
5. All surrogate recoveries were within acceptance criteria.
6. The blank spike recovery was within acceptance criteria.
7. All matrix spike recoveries were within acceptance criteria.
8. All initial calibrations associated with this data set were within acceptance criteria.
9. All continuing calibration standards analyzed prior to sample extracts were within acceptance criteria.



*J. Michael Taylor*  
J. Michael Taylor

Vice President  
Lionville Analytical Laboratory

*09-23-98*  
Date

son\group\data\pcb\word6.0\pest-pcb\tnu8p339.doc

The results presented in this report relate only to the analytical testing and conditions of the samples at receipt and during storage. All pages of this report are integral parts of the analytical data. Therefore, this report should only be reproduced in its entirety of 7 pages.

001

## GLOSSARY OF PESTICIDE/PCB DATA

### DATA QUALIFIERS

- U** = Indicates that the compound was analyzed for but not detected. The minimum detection limit for the sample (not the method detection limit) is reported with the U (e.g., 10U).
- J** = Indicates an estimated value. This flag is used in cases where a target analyte is detected at a level less than the lower quantification level. If the limit of quantification is 10 ug/L and a concentration of 3 ug/L is calculated, it is reported as 3J.
- B** = This flag is used when the analyte is found in the associated blank as well as in the sample. It indicates possible/probable blank contamination.
- E** = Indicates that the compound was detected beyond the calibration range and was subsequently analyzed at a dilution.
- I** = Interference.

### ABBREVIATIONS

- BS** = Indicates blank spike in which reagent grade water is spiked with the CLP matrix spiking solutions and carried through all the steps in the method. Spike recoveries are reported.
- BSD** = Indicates blank spike duplicate.
- MS** = Indicates matrix spike.
- MSD** = Indicates matrix spike duplicate.
- DL** = Indicates that recoveries were not obtained because the extract had to be diluted for analysis.
- NA** = Not Applicable.
- DF** = Dilution Factor.
- NR** = Not Required.
- SP** = Indicates Spiked Compound.

## GLOSSARY OF PESTICIDE/PCB DATA

- P**     =     This flag is used for a pesticide/Aroclor target analyte when there is greater than 25% difference for detected concentrations between the two GC columns (see Form X). The lower of the two values is reported on Form I and flagged with a "P".
- D**     =     This flag identifies all compounds identified in an analysis at a secondary dilution factor.
- C**     =     This flag applies to a compound that has been confirmed by GC/MS.

## PCBs by GC

RFW Batch Number: 9808L339

Client: **TNU-HANFORD B98-060**

Work Order: 10985001001 Page: 1

|          |        |        |         |        |        |              |
|----------|--------|--------|---------|--------|--------|--------------|
| Cust ID: | B0PPC1 | B0PPC1 | B0PPC1  | B0PPC2 | B0PPC3 | PBLKNM       |
| RFW#:    | 001    | 001 MS | 001 MSD | 002    | 003    | 98LE1367-MB1 |
| Matrix:  | WATER  | WATER  | WATER   | WATER  | WATER  | WATER        |
| D.F.:    | 1.00   | 1.00   | 1.00    | 1.00   | 1.00   | 1.00         |
| Units:   | UG/L   | UG/L   | UG/L    | UG/L   | UG/L   | UG/L         |

| Surrogate:   | Tetrachloro-m-xylene | 68 | % | 48  | % | 65  | % | 55 | % | 62 | % | 32  | % |
|--------------|----------------------|----|---|-----|---|-----|---|----|---|----|---|-----|---|
|              | Decachlorobiphenyl   | 86 | % | 67  | % | 89  | % | 93 | % | 93 | % | 91  | % |
|              |                      | fl |   | fl  |   | fl  |   | fl |   | fl |   | fl  |   |
| Aroclor-1016 |                      | 10 | U | 4.2 | U | 5.3 | U | 14 | U | 14 | U | 1.0 | U |
| Aroclor-1221 |                      | 20 | U | 8.3 | U | 11  | U | 29 | U | 29 | U | 2.0 | U |
| Aroclor-1232 |                      | 10 | U | 4.2 | U | 5.3 | U | 14 | U | 14 | U | 1.0 | U |
| Aroclor-1242 |                      | 10 | U | 4.2 | U | 5.3 | U | 14 | U | 14 | U | 1.0 | U |
| Aroclor-1248 |                      | 10 | U | 4.2 | U | 5.3 | U | 14 | U | 14 | U | 1.0 | U |
| Aroclor-1254 |                      | 10 | U | 86  | % | 89  | % | 14 | U | 14 | U | 1.0 | U |
| Aroclor-1260 |                      | 10 | U | 4.2 | U | 5.3 | U | 14 | U | 14 | U | 1.0 | U |

Cust ID: PBLKNM BS

|             |         |              |
|-------------|---------|--------------|
| Sample      | RFW#:   | 98LE1367-MB1 |
| Information | Matrix: | WATER        |
|             | D.F.:   | 1.00         |
|             | Units:  | UG/L         |

[illegible]

U= Analyzed, not detected. J= Present below detection limit. B= Present in blank. NR= Not reported. NS= Not spiked.  
%= Percent recovery. D= Diluted out. I= Interference. NA= Not Applicable. \*= Outside of EPA CLP QC

004

Recra LabNet - Lionville Laboratory  
PCB ANALYTICAL DATA PACKAGE FOR  
TNU-HANFORD B98-060

DATE RECEIVED: 08/15/98

RFW LOT # :9808L339

| CLIENT ID | RFW #   | MTX | PREP #   | COLLECTION | EXTR/PREP | ANALYSIS |
|-----------|---------|-----|----------|------------|-----------|----------|
| BOPPC1    | 001     | W   | 98LE1367 | 08/10/98   | 08/17/98  | 08/21/98 |
| BOPPC1    | 001 MS  | W   | 98LE1367 | 08/10/98   | 08/17/98  | 08/22/98 |
| BOPPC1    | 001 MSD | W   | 98LE1367 | 08/10/98   | 08/17/98  | 08/22/98 |
| BOPPC2    | 002     | W   | 98LE1367 | 08/10/98   | 08/17/98  | 08/22/98 |
| BOPPC3    | 003     | W   | 98LE1367 | 08/10/98   | 08/17/98  | 08/22/98 |

LAB QC:

|        |        |   |          |     |          |          |
|--------|--------|---|----------|-----|----------|----------|
| PBLKNM | MB1    | W | 98LE1367 | N/A | 08/17/98 | 08/21/98 |
| PBLKNM | MB1 BS | W | 98LE1367 | N/A | 08/17/98 | 08/21/98 |

*BM 9/16/98*

## Custody Transfer Record/Lab Work Request Page 1 of 1



9808L339

FIELD PERSONNEL: COMPLETE ONLY SHADED AREAS

|   |  |  |  |                    |  |                       |     |                      |      |        |  |                |     |                |  |  |  |  |  |
|---|--|--|--|--------------------|--|-----------------------|-----|----------------------|------|--------|--|----------------|-----|----------------|--|--|--|--|--|
| Client <u>TNU - Hanford</u> <u>B98-060</u>        |  |  |  | Refrigerator #     |  | 1                     | 3   |                      |      |        |  | 3              | 3   | 3              |  |  |  |  |  |
| Est. Final Proj. Sampling Date                    |  |  |  | #/Type Container   |  | Liquid                | 3g  | 1g                   |      |        |  | 3g             | 1g  | 1g             |  |  |  |  |  |
| Project # <u>10985-001-001-9999-00</u>            |  |  |  |                    |  | Solid                 |     |                      |      |        |  |                |     |                |  |  |  |  |  |
| Project Contact/Phone #                           |  |  |  | Volume             |  | Liquid                | 40  | 250                  |      |        |  | 115/250        | 250 | 250            |  |  |  |  |  |
| RECRA Project Manager <u>M/S</u>                  |  |  |  |                    |  | Solid                 |     |                      |      |        |  |                |     |                |  |  |  |  |  |
| QC <u>SPEC</u> Del <u>STD</u> TAT <u>30 day</u>   |  |  |  | Preservatives      |  |                       | -   | -                    |      |        |  | <u>HNO3</u>    | -   | -              |  |  |  |  |  |
| Date Rec'd <u>8/15/98</u> Date Due <u>9/14/98</u> |  |  |  | ANALYSES REQUESTED |  | ORGANIC               |     |                      |      |        |  | INORG          |     |                |  |  |  |  |  |
| Account # <u>TNU - HANFORD</u>                    |  |  |  |                    |  | VOA                   | BNA | Pes/PCB              | Herb |        |  | Metal          | C   |                |  |  |  |  |  |
|   |  |  |  |                    |  | RECRA LabNet Use Only |     |                      |      |        |  |                |     |                |  |  |  |  |  |
| MATRIX CODES:                                     |  |  |  | Lab ID             |  | Client ID/Description |     | Matrix QC Chosen (✓) |      | Matrix |  | Date Collected |     | Time Collected |  |  |  |  |  |
| S - Soil  |  |  |  |                    |  |                       |     | MS                   |      | MSD    |  |                |     |                |  |  |  |  |  |
| SE - Sediment                                     |  |  |  |                    |  |                       |     |                      |      |        |  |                |     |                |  |  |  |  |  |
| SO - Solid  |  |  |  |                    |  |                       |     |                      |      |        |  |                |     |                |  |  |  |  |  |
| SL - Sludge                                       |  |  |  |                    |  |                       |     |                      |      |        |  |                |     |                |  |  |  |  |  |
| W - Water   |  |  |  |                    |  |                       |     |                      |      |        |  |                |     |                |  |  |  |  |  |
| O - Oil   |  |  |  |                    |  |                       |     |                      |      |        |  |                |     |                |  |  |  |  |  |
| A - Air   |  |  |  |                    |  |                       |     |                      |      |        |  |                |     |                |  |  |  |  |  |
| DS - Drum Solids                                  |  |  |  |                    |  |                       |     |                      |      |        |  |                |     |                |  |  |  |  |  |
| DL - Drum Liquids                                 |  |  |  |                    |  |                       |     |                      |      |        |  |                |     |                |  |  |  |  |  |
| L - EP/TCLP Leachate                              |  |  |  |                    |  |                       |     |                      |      |        |  |                |     |                |  |  |  |  |  |
| WI - Wipe   |  |  |  |                    |  |                       |     |                      |      |        |  |                |     |                |  |  |  |  |  |
| X - Other   |  |  |  |                    |  |                       |     |                      |      |        |  |                |     |                |  |  |  |  |  |
| F - Fish  |  |  |  |                    |  |                       |     |                      |      |        |  |                |     |                |  |  |  |  |  |

Special Instructions:

DATE/REVISIONS:

\* Analyst must pick a sample + run matrix QC \*

1. SAF # - B98-060
- 2.
3. INED = ICCL, ICFL, ICNO<sub>2</sub>, ICNO<sub>3</sub>, ICNO<sub>4</sub>
- 4.
- 5.
- 6.

RECRA LabNet Use Only

- |  |   |
|--|---|
| Samples were<br>1) Shipped or<br>Hand Delivered    | COC Tape was<br>1) Present on Outer<br>Package Y or N |
| Airbill # *  | 2) Unbroken on Outer<br>Package Y or N                |
| 2) Ambient or Chilled                              | 3) Preserved Sample<br>Y or N                         |
| 3) Received in Good<br>Condition Y or N            | 4) Unbroken on<br>Sample Y or N                       |
| 4) Labels Indicate<br>Properly Preserved<br>Y or N | COC Record Present<br>Upon Sample Rec'd<br>Y or N     |
| 5) Received Within<br>Holding Time Y or N          | COC Label<br>Y or N                                   |

| Relinquished by | Received by | Date    | Time | Relinquished by | Received by | Date | Time |
|-----------------|-------------|---------|------|-----------------|-------------|------|------|
| Jed ex          | Jed ex      | 8/15/98 | 0930 |                 |             |      |      |

Discrepancies Between  
Samples Labels and  
COC Record? Y or N

NOTES  
\* 1225 Y 1223

|   |  |   |  |                                    |  |                                  |  |                                       |  |             |  |
|---|--|---|--|------------------------------------|--|----------------------------------|--|---------------------------------------|--|-------------|--|
| Bechtel Hanford Inc.  |  | <b>CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST</b> |  |                                    |  |                                  |  | B98-060-09                            |  | Page 1 of 1 |  |
| Collector<br>Doug Bryant  |  | Company Contact<br>Michael Gulgoul              |  | Telephone No.<br>373-5681          |  | Project Coordinator<br>WEISS, RL |  | Data Turnaround<br><br><b>45 Days</b> |  |             |  |
| Project Designation<br>202-S Building - Plutonium Loadout Hood - Other Liquid       |  | Sampling Location<br>200 West                   |  | SAF No.<br>B98-060                 |  |                                  |  |                                       |  |             |  |
| Ice Chest No.   |  | Field Logbook No.<br>EL-1429                    |  | Method of Shipment<br>Hand deliver |  |                                  |  |                                       |  |             |  |
| Shipped To<br>TMA/RECRA Lab Net<br>RF   |  | Offsite Property No.                            |  | Bill of Lading/Air Bill No.        |  |                                  |  |                                       |  |             |  |
| Waste Designation<br>Client determined no waste codes associated with this project. |  |   |  | COA                                |  |                                  |  |                                       |  |             |  |

| POSSIBLE SAMPLE HAZARDS/REMARKS            | Preservation        | HNO3<br><del>None</del><br>RF | HNO3<br><del>None</del><br>RF | HNO3  | Cool 4C | Cool 4C | HNO3<br><del>None</del><br>RF | None  | Cool 4C | HNO3<br><del>None</del><br>RF |
|--|---------------------|-------------------------------|-------------------------------|-------|---------|---------|-------------------------------|-------|---------|-------------------------------|
|  | Type of Container   | aG                            | aG                            | aG    | aG      | aG      | aG                            | aG    | aGs*    | aG                            |
|  | No. of Container(s) | 1                             | 1                             | 1     | 1       | 1       | 1                             | 1     | 3       | 3                             |
| Special Handling and/or Storage<br>Cool 4C | Volume              | 20mL                          | 20mL                          | 125mL | 250mL   | 250mL   | 250mL                         | 250mL | 40mL    | 500mL                         |

| SAMPLE ANALYSIS |              |             |             | See item (1) in Special Instructions. | Gamma Alpha; Gross Beta | Mercury - 7471 - (CV) | IC Anions - 300.9; IC Anions - 300.9 Add On | PCBs - 8000 | ICP Metals - 6010A (SW-846); ICP Metals - 6010A (Add-on) (Lead) | pH (Water) - 9040 | VOA - 8260A (TCL) | See item (2) in Special Instructions. |
|-----------------|--------------|-------------|-------------|---------------------------------------|-------------------------|-----------------------|---|-------------|---|-------------------|-------------------|---------------------------------------|
| Sample No.      | Matrix *     | Sample Date | Sample Time |                                       |                         |                       |   |             |   |                   |                   |                                       |
| BOPPC1          | Other Liquid | 8.10.98     | 1500        |                                       |                         | X                     | X   | X           | X   | X                 | X                 |                                       |
| BOPPC2          | Other Liquid | 8.10.98     | 1505        |                                       |                         | X                     | X   | X           | X   | X                 | X                 |                                       |
| BOPPC3          | Other Liquid | 8.10.98     | 1520        |                                       |                         | X                     | X   | X           | X   | X                 | X                 |                                       |
|                 |              |             |             |                                       |                         |                       |   |             |   |                   |                   |                                       |
|                 |              |             |             |                                       |                         |                       |   |             |   |                   |                   |                                       |

| CHAIN OF POSSESSION |           | Sign/Print Names |           | SPECIAL INSTRUCTIONS   |  |  |  | Matrix *  |  |
|---------------------|-----------|------------------|-----------|--|--|--|--|---|--|
| Relinquished By     | Date/Time | Received By      | Date/Time | <p>** The following will hold samples until notified by ERG Sample and Data Management to begin analysis, unless holding times go in jeopardy.</p> <p>(1) Americium-241/Curium-244, Neptunium-237, Plutonium-239, 240, 241, 242, 243, 244, 245, 246, 247, 248, 249, 250, 251, 252, 253, 254, 255, 256, 257, 258, 259, 260, 261, 262, 263, 264, 265, 266, 267, 268, 269, 270, 271, 272, 273, 274, 275, 276, 277, 278, 279, 280, 281, 282, 283, 284, 285, 286, 287, 288, 289, 290, 291, 292, 293, 294, 295, 296, 297, 298, 299, 300, 301, 302, 303, 304, 305, 306, 307, 308, 309, 310, 311, 312, 313, 314, 315, 316, 317, 318, 319, 320, 321, 322, 323, 324, 325, 326, 327, 328, 329, 330, 331, 332, 333, 334, 335, 336, 337, 338, 339, 340, 341, 342, 343, 344, 345, 346, 347, 348, 349, 350, 351, 352, 353, 354, 355, 356, 357, 358, 359, 360, 361, 362, 363, 364, 365, 366, 367, 368, 369, 370, 371, 372, 373, 374, 375, 376, 377, 378, 379, 380, 381, 382, 383, 384, 385, 386, 387, 388, 389, 390, 391, 392, 393, 394, 395, 396, 397, 398, 399, 400, 401, 402, 403, 404, 405, 406, 407, 408, 409, 410, 411, 412, 413, 414, 415, 416, 417, 418, 419, 420, 421, 422, 423, 424, 425, 426, 427, 428, 429, 430, 431, 432, 433, 434, 435, 436, 437, 438, 439, 440, 441, 442, 443, 444, 445, 446, 447, 448, 449, 450, 451, 452, 453, 454, 455, 456, 457, 458, 459, 460, 461, 462, 463, 464, 465, 466, 467, 468, 469, 470, 471, 472, 473, 474, 475, 476, 477, 478, 479, 480, 481, 482, 483, 484, 485, 486, 487, 488, 489, 490, 491, 492, 493, 494, 495, 496, 497, 498, 499, 500, 501, 502, 503, 504, 505, 506, 507, 508, 509, 510, 511, 512, 513, 514, 515, 516, 517, 518, 519, 520, 521, 522, 523, 524, 525, 526, 527, 528, 529, 530, 531, 532, 533, 534, 535, 536, 537, 538, 539, 540, 541, 542, 543, 544, 545, 546, 547, 548, 549, 550, 551, 552, 553, 554, 555, 556, 557, 558, 559, 560, 561, 562, 563, 564, 565, 566, 567, 568, 569, 570, 571, 572, 573, 574, 575, 576, 577, 578, 579, 580, 581, 582, 583, 584, 585, 586, 587, 588, 589, 590, 591, 592, 593, 594, 595, 596, 597, 598, 599, 600, 601, 602, 603, 604, 605, 606, 607, 608, 609, 610, 611, 612, 613, 614, 615, 616, 617, 618, 619, 620, 621, 622, 623, 624, 625, 626, 627, 628, 629, 630, 631, 632, 633, 634, 635, 636, 637, 638, 639, 640, 641, 642, 643, 644, 645, 646, 647, 648, 649, 650, 651, 652, 653, 654, 655, 656, 657, 658, 659, 660, 661, 662, 663, 664, 665, 666, 667, 668, 669, 670, 671, 672, 673, 674, 675, 676, 677, 678, 679, 680, 681, 682, 683, 684, 685, 686, 687, 688, 689, 690, 691, 692, 693, 694, 695, 696, 697, 698, 699, 700, 701, 702, 703, 704, 705, 706, 707, 708, 709, 710, 711, 712, 713, 714, 715, 716, 717, 718, 719, 720, 721, 722, 723, 724, 725, 726, 727, 728, 729, 730, 731, 732, 733, 734, 735, 736, 737, 738, 739, 740, 741, 742, 743, 744, 745, 746, 747, 748, 749, 750, 751, 752, 753, 754, 755, 756, 757, 758, 759, 760, 761, 762, 763, 764, 765, 766, 767, 768, 769, 770, 771, 772, 773, 774, 775, 776, 777, 778, 779, 780, 781, 782, 783, 784, 785, 786, 787, 788, 789, 790, 791, 792, 793, 794, 795, 796, 797, 798, 799, 800, 801, 802, 803, 804, 805, 806, 807, 808, 809, 810, 811, 812, 813, 814, 815, 816, 817, 818, 819, 820, 821, 822, 823, 824, 825, 826, 827, 828, 829, 830, 831, 832, 833, 834, 835, 836, 837, 838, 839, 840, 841, 842, 843, 844, 845, 846, 847, 848, 849, 850, 851, 852, 853, 854, 855, 856, 857, 858, 859, 860, 861, 862, 863, 864, 865, 866, 867, 868, 869, 870, 871, 872, 873, 874, 875, 876, 877, 878, 879, 880, 881, 882, 883, 884, 885, 886, 887, 888, 889, 890, 891, 892, 893, 894, 895, 896, 897, 898, 899, 900, 901, 902, 903, 904, 905, 906, 907, 908, 909, 910, 911, 912, 913, 914, 915, 916, 917, 918, 919, 920, 921, 922, 923, 924, 925, 926, 927, 928, 929, 930, 931, 932, 933, 934, 935, 936, 937, 938, 939, 940, 941, 942, 943, 944, 945, 946, 947, 948, 949, 950, 951, 952, 953, 954, 955, 956, 957, 958, 959, 960, 961, 962, 963, 964, 965, 966, 967, 968, 969, 970, 971, 972, 973, 974, 975, 976, 977, 978, 979, 980, 981, 982, 983, 984, 985, 986, 987, 988, 989, 990, 991, 992, 993, 994, 995, 996, 997, 998, 999, 1000.</p> <p>(2) Gamma Spectroscopy (Cesium-137, Cobalt-60, Europium-152, Europium-154, Europium-155), Gamma Spec - Add on (Americium-241, Antimony-125, Cesium-134, Radium-226, Radium-228)</p> <p>4235 7951 5933</p> |  |  |  | <p>S - Soil</p> <p>SE - Sediment</p> <p>SO - Solid</p> <p>SL - Sludge</p> <p>W - Water</p> <p>O - Oil</p> <p>A - Air</p> <p>DS - Drum Solids</p> <p>DL - Drum Liquids</p> <p>T - Tissue</p> <p>WI - Wipe</p> <p>L - Liquid</p> <p>V - Vegetation</p> <p>X - Other</p> |  |
| Relinquished By     | Date/Time | Received By      | Date/Time |  |  |  |  |   |  |
| Relinquished By     | Date/Time | Received By      | Date/Time |  |  |  |  |   |  |
| Relinquished By     | Date/Time | Received By      | Date/Time |  |  |  |  |   |  |

|                          |                 |             |           |
|--------------------------|-----------------|-------------|-----------|
| LABORATORY SECTION       | Received By     | Title       | Date/Time |
| FINAL SAMPLE DISPOSITION | Disposal Method | Disposed By | Date/Time |



**RECRA  
LabNet**

a division of Recra Environmental, Inc.

Virtual Laboratories Everywhere

**Recra LabNet Philadelphia  
Analytical Report**

**Client :** TNU-HANFORD B98-104

**RFW# :** 9808L339

**SDG/SAF #:** H0198/B98-104

**W.O. #:** 10985-001-001-9999-00

**Date Received:** 08-15-98

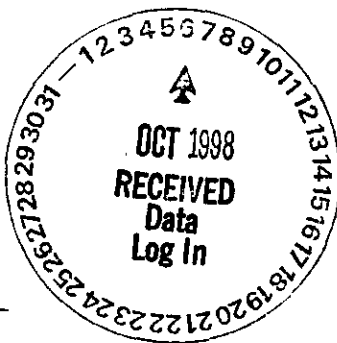
**GC/MS VOLATILE**

The set of samples consisted of three (3) water samples collected on 08-10-98.

The samples were analyzed according to criteria set forth in SW 846 Method 8260A for TCL Volatile target compounds on 08-19-98.

The following is a summary of the QC results accompanying these sample results and a description of any problems encountered during their analyses:

1. The cooler temperature upon receipt has been recorded on the chain-of-custody.
2. The required holding time for analysis was met.
3. Non-target compounds were not detected in these samples.
4. All surrogate recoveries were within EPA QC limits.
5. All matrix spike recoveries were within EPA QC limits.
6. The method blank contained the common laboratory contaminants Methylene Chloride and Acetone at levels less than 2x the CRQL and the target compound 2-Butanone at a level less than the CRQL.



*for* May M. Ziegler  
Chuck Stefanosky  
Laboratory Director  
Lionville Analytical Laboratory

9-10-98  
Date

mmz/voa/08-339v.cn

The results presented in this report relate only to the analytical testing and conditions of the samples at receipt and during storage. All pages of this report are integral parts of the analytical data. Therefore, this report should only be reproduced in its entirety of 8 pages.

## GLOSSARY OF VOA DATA

### DATA QUALIFIERS

|    |   |   |
|----|---|---|
| U  | = | Compound was analyzed for but not detected. The associated numerical value is the estimated sample quantitation limit which is included and corrected for dilution and percent moisture.  |
| J  | = | Indicates an estimated value. This flag is used under the following circumstances: 1) when estimating a concentration for tentatively identified compounds (TICs) where a 1:1 response is assumed; or 2) when the mass spectral data indicate the presence of a compound that meets the identification criteria but the result is less than the specified detection limit but greater than zero. For example, if the limit of detection is 10 ug/L and a concentration of 3 ug/L is calculated, it is reported as 3J. |
| B  | = | This flag is used when the analyte is found in the associated blank as well as in the sample. It indicates possible/probable blank contamination. This flag is also used for a TIC as well as for a positively identified TCL compound.   |
| E  | = | Indicates that the compound was detected beyond the calibration range and was subsequently analyzed at a dilution.  |
| D  | = | Identifies all compounds identified in an analysis at a secondary dilution factor.  |
| I  | = | Interference.   |
| NQ | = | Result qualitatively confirmed but not able to quantify.  |
| N  | = | Indicates presumptive evidence of a compound. This flag is only used for tentatively identified compounds (TICs), where the identification is based on a mass spectral library search. It is applied to all TIC results. For generic characterization of a TIC, such as chlorinated hydrocarbon, the N code is not used.  |
| X  | = | This flag is used for a TIC compound which is quantified relative to a response factor generated from a daily calibration standard (rather than quantified relative to the closest internal standard).  |
| Y  | = | Additional qualifiers used as required are explained in the case narrative.   |



## GLOSSARY OF VOA DATA

### ABBREVIATIONS

|              |   |  |
|--------------|---|--|
| <b>BS</b>    | = | Indicates blank spike in which reagent grade water is spiked with the CLP matrix spike solutions and carried through all the steps in the method. Spike recoveries are reported. |
| <b>BSD</b>   | = | Indicates blank spike duplicate.   |
| <b>MS</b>    | = | Indicates matrix spike.  |
| <b>MSD</b>   | = | Indicates matrix spike duplicate.  |
| <b>DL</b>    | = | Suffix added to sample number to indicate that results are from a diluted analysis.  |
| <b>NA</b>    | = | Not Applicable.  |
| <b>DF</b>    | = | Dilution Factor.   |
| <b>NR</b>    | = | Not Required.  |
| <b>SP, Z</b> | = | Indicates Spiked Compound.   |



Volatiles by GC/MS, HSL List

RFW Batch Number: 9808L339

Client: **TNU-HANFORD B98-060**

Work Order: 10985001001 Page: 1a

[illegible]

\*= Outside of EPA CLP QC limits.

Cust ID: BOPPC1 BOPPC1 BOPPC1 BOPPC2 BOPPC3 VBLKQU

RFW#: 001 001 MS 001 MSD 002 003 98LVX511-MB1

|                |     |      |      |     |     |     |
|----------------|-----|------|------|-----|-----|-----|
| Chlorobenzene  | 5 U | 87 % | 89 % | 5 U | 5 U | 5 U |
| Ethylbenzene   | 5 U | 5 U  | 5 U  | 5 U | 5 U | 5 U |
| Styrene        | 5 U | 5 U  | 5 U  | 5 U | 5 U | 5 U |
| Xylene (total) | 5 U | 5 U  | 5 U  | 5 U | 5 U | 5 U |

\*= Outside of EPA CLP QC limits.

Recra LabNet - Lionville Laboratory  
VOA ANALYTICAL DATA PACKAGE FOR  
TNU-HANFORD B98-060

DATE RECEIVED: 08/15/98

RFW LOT # :9808L339

| CLIENT ID | RFW #   | MTX | PREP #   | COLLECTION | EXTR/PREP | ANALYSIS |
|-----------|---------|-----|----------|------------|-----------|----------|
| BOPPC1    | 001     | W   | 98LVX511 | 08/10/98   | N/A       | 08/19/98 |
| BOPPC1    | 001 MS  | W   | 98LVX511 | 08/10/98   | N/A       | 08/19/98 |
| BOPPC1    | 001 MSD | W   | 98LVX511 | 08/10/98   | N/A       | 08/19/98 |
| BOPPC2    | 002     | W   | 98LVX511 | 08/10/98   | N/A       | 08/19/98 |
| BOPPC3    | 003     | W   | 98LVX511 | 08/10/98   | N/A       | 08/19/98 |

LAB QC:

|        |     |   |          |     |     |          |
|--------|-----|---|----------|-----|-----|----------|
| VBLKQU | MB1 | W | 98LVX511 | N/A | N/A | 08/19/98 |
|--------|-----|---|----------|-----|-----|----------|

**FIELD PERSONNEL: COMPLETE ONLY SHADED AREAS**



|   |  |  |  |                       |  |                       |     |                |      |                |       |             |     |     |  |  |  |  |  |  |  |  |  |  |
|---|--|--|--|-----------------------|--|-----------------------|-----|----------------|------|----------------|-------|-------------|-----|-----|--|--|--|--|--|--|--|--|--|--|
| Client <u>TNU- Hanford B98-060</u>                |  |  |  | Refrigerator #        |  | 1                     | 3   |                |      |                |       | 3           | 3   | 3   |  |  |  |  |  |  |  |  |  |  |
| Est. Final Proj. Sampling Date                    |  |  |  | #/Type Container      |  | Liquid                | 30g | 1g             |      |                |       | 1g          | 1g  | 1g  |  |  |  |  |  |  |  |  |  |  |
| Project # <u>10985-001-001-9999-00</u>            |  |  |  | Volume                |  | Liquid                | 40  | 250            |      |                |       | 115/250     | 250 | 250 |  |  |  |  |  |  |  |  |  |  |
| Project Contact/Phone #                           |  |  |  | Preservatives         |  | Solid                 |     |                |      |                |       |             |     |     |  |  |  |  |  |  |  |  |  |  |
| RECRA Project Manager <u>MIS</u>                  |  |  |  |                       |  |                       |     |                |      |                |       | <u>HNO3</u> |     |     |  |  |  |  |  |  |  |  |  |  |
| QC <u>SPEC</u> Del <u>STD</u> TAT <u>30 days</u>  |  |  |  | ANALYSES REQUESTED →  |  | ORGANIC               |     |                |      |                | INORG |             |     |     |  |  |  |  |  |  |  |  |  |  |
| Date Rec'd <u>8/15/98</u> Date Due <u>9/14/98</u> |  |  |  |                       |  | VOA                   | BNA | Pea/PCB        | Herb |                |       | Metal       | CN  |     |  |  |  |  |  |  |  |  |  |  |
| Account # <u>TNU- HANFORD</u>                     |  |  |  |                       |  | RECRA LabNet Use Only |     |                |      |                |       |             |     |     |  |  |  |  |  |  |  |  |  |  |
| MATRIX CODES:                                     |  |  |  | Matrix OC Chosen (✓)  |  |                       |     |                |      |                |       |             |     |     |  |  |  |  |  |  |  |  |  |  |
| S - Soil  |  |  |  | MS MSD                |  |                       |     |                |      |                |       |             |     |     |  |  |  |  |  |  |  |  |  |  |
| SE - Sediment                                     |  |  |  |                       |  |                       |     |                |      |                |       |             |     |     |  |  |  |  |  |  |  |  |  |  |
| SO - Solid  |  |  |  |                       |  |                       |     |                |      |                |       |             |     |     |  |  |  |  |  |  |  |  |  |  |
| SL - Sludge                                       |  |  |  |                       |  |                       |     |                |      |                |       |             |     |     |  |  |  |  |  |  |  |  |  |  |
| W - Water   |  |  |  |                       |  |                       |     |                |      |                |       |             |     |     |  |  |  |  |  |  |  |  |  |  |
| O - Oil   |  |  |  |                       |  |                       |     |                |      |                |       |             |     |     |  |  |  |  |  |  |  |  |  |  |
| A - Air   |  |  |  |                       |  |                       |     |                |      |                |       |             |     |     |  |  |  |  |  |  |  |  |  |  |
| DS - Drum Solids                                  |  |  |  |                       |  |                       |     |                |      |                |       |             |     |     |  |  |  |  |  |  |  |  |  |  |
| DL - Drum Liquids                                 |  |  |  |                       |  |                       |     |                |      |                |       |             |     |     |  |  |  |  |  |  |  |  |  |  |
| L - EP/TCLP Leachate                              |  |  |  |                       |  |                       |     |                |      |                |       |             |     |     |  |  |  |  |  |  |  |  |  |  |
| WI - Wipe   |  |  |  |                       |  |                       |     |                |      |                |       |             |     |     |  |  |  |  |  |  |  |  |  |  |
| X - Other   |  |  |  |                       |  |                       |     |                |      |                |       |             |     |     |  |  |  |  |  |  |  |  |  |  |
| F - Fish  |  |  |  |                       |  |                       |     |                |      |                |       |             |     |     |  |  |  |  |  |  |  |  |  |  |
| Lab ID  |  |  |  | Client ID/Description |  | Matrix                |     | Date Collected |      | Time Collected |       | ↓           |     |     |  |  |  |  |  |  |  |  |  |  |
| 001   |  |  |  | BOPPC1                |  | W                     |     | 8/10/98        |      | 1500           |       | ↓           |     |     |  |  |  |  |  |  |  |  |  |  |
| 002   |  |  |  | 1 2                   |  | 1                     |     | 1              |      | 1505           |       | ↓           |     |     |  |  |  |  |  |  |  |  |  |  |
| 003   |  |  |  | 1 3                   |  | 1                     |     | 1              |      | 1620           |       | ↓           |     |     |  |  |  |  |  |  |  |  |  |  |

**Special instructions:**

**DATE/REVISIONS:**

- \* Analyst must pick a sample + run matrix QC \*

3. SAF# - B98-060

4. INE(1) = ICCL, ICFL, ICNO2, ICNO3,  
ICSO4

**RECRA LabNet Use Only**

|                       |                      |
|-----------------------|----------------------|
| Samples were          | COC Tape was.        |
| 1) Shipped or         | 1) Present on Outer  |
| Hand Delivered        | Package Y or N       |
| Airbill #             | 2) Unbroken on Outer |
| 2) Ambient or Chilled | Package Y or N       |
| 3) Received in Good   | 3) Present on Sample |
| Condition Y or N      | Y or N               |
| 4) Labels to locate   | 4) Unbroken on       |
| Properly Preserved    | Sample Y or N        |
| Y or N                | COC Record Present   |
| 5) Received Within    | Upon Sample Rec'd    |
| Holding Times         | Y or N               |
| Y or N                | Cooler               |
|                       | Temp. 18-8           |

| Relinquished by | Received by | Date    | Time |
|-----------------|-------------|---------|------|
| Reddy           | Yalla       | 8/15/98 | 0930 |
|                 |             |         |      |
|                 |             |         |      |

Discrepancies Between  
Samples Labels and  
COC Record? Y or N

\* 1226 x 1516 1226

|   |  |  |  |                                    |  |                                  |  |                                       |  |             |  |
|---|--|--|--|------------------------------------|--|----------------------------------|--|---------------------------------------|--|-------------|--|
| Bechtel Hanford Inc.  |  | CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST |  |                                    |  |                                  |  | B98-060-09                            |  | Page 1 of 1 |  |
| Collector<br>Doug Bryant  |  | Company Contact<br>Michael Gaigoul       |  | Telephone No.<br>373-5681          |  | Project Coordinator<br>WEISS, RL |  | Data Turnaround<br><br><b>45 Days</b> |  |             |  |
| Project Designation<br>202-S Building - Plutonium Loadout Hood - Other Liquid       |  | Sampling Location<br>200 West            |  | SAF No.<br>B98-060                 |  |                                  |  |                                       |  |             |  |
| Ice Chest No.   |  | Field Logbook No.<br>EL-1429             |  | Method of Shipment<br>Hand deliver |  |                                  |  | 00<br>00                              |  |             |  |
| Shipped To<br>JMA/RECRA Lab Net<br>RF   |  | Offsite Property No.                     |  | Bill of Lading/Air Bill No.        |  |                                  |  |                                       |  |             |  |
| Waste Designation<br>Client determined no waste codes associated with this project. |  |  |  |                                    |  | COA                              |  |                                       |  |             |  |

| POSSIBLE SAMPLE HAZARDS/REMARKS            | Preservation        | HNO3<br>None<br>RF | HNO3<br>None<br>RF | HNO3  | Cool 4C | Cool 4C | HNO3<br>None<br>RF | None  | Cool 4C | HNO3<br>None<br>RF |  |
|--|---------------------|--------------------|--------------------|-------|---------|---------|--------------------|-------|---------|--------------------|--|
|  | Type of Container   | aG                 | aG                 | aG    | aG      | aG      | aG                 | aG    | aGs*    | aG                 |  |
|  | No. of Container(s) | 1                  | 1                  | 1     | 1       | 1       | 1                  | 1     | 3       | 3                  |  |
|  | Volume              | 20mL               | 20mL               | 125mL | 250mL   | 250mL   | 250mL              | 250mL | 40mL    | 500mL              |  |
| Special Handling and/or Storage<br>Cool 4C |                     |                    |                    |       |         |         |                    |       |         |                    |  |

| SAMPLE ANALYSIS |  |  |  | See item (1) in Special Instructions. | Gross Alpha; Gross Beta | Mercury - 7471 - (CV) | IC Anions - 300.0; IC Anions - 300.0 Add On | PCBs - 8000 | ICP Metals - 6010A (SW-846); ICP Metals - 6010A (Add-on) (Lead) | pH (Water) - 9040 | VOA - 8260A (TCL) | See item (2) in Special Instructions. |
|-----------------|--|--|--|---------------------------------------|-------------------------|-----------------------|---|-------------|---|-------------------|-------------------|---------------------------------------|
|-----------------|--|--|--|---------------------------------------|-------------------------|-----------------------|---|-------------|---|-------------------|-------------------|---------------------------------------|

| Sample No. | Matrix *     | Sample Date | Sample Time |  |  |   |   |   |   |   |   |
|------------|--------------|-------------|-------------|--|--|---|---|---|---|---|---|
| BOPPC1     | Other Liquid | 8.10.98     | 1500        |  |  | X | X | X | X | X | X |
| BOPPC2     | Other Liquid | 8.10.98     | 1505        |  |  | X | X | X | X | X |   |
| BOPPC3     | Other Liquid | 8.10.98     | 1520        |  |  | X | X | X | X | X |   |
|            |              |             |             |  |  |   |   |   |   |   |   |
|            |              |             |             |  |  |   |   |   |   |   |   |

| CHAIN OF POSSESSION                         | Sign/Print Names          |                       | SPECIAL INSTRUCTIONS |
|---|---------------------------|-----------------------|----------------------|
| Relinquished By<br>R. Feldman for D. Bryant | Date/Time<br>8.14.98 1300 | Received By<br>Fed Ex | Date/Time<br>1300    |
| Relinquished By                             | Date/Time                 | Received By           | Date/Time            |
| Relinquished By                             | Date/Time                 | Received By           | Date/Time            |
| Relinquished By                             | Date/Time                 | Received By           | Date/Time            |

**SPECIAL INSTRUCTIONS**

\*\* The Laboratory will hold samples until notified by B98 Sample and Data Management to begin analysis, unless holding times are in jeopardy.

(1) Americium-241/Ce-144; Neptunium-237; Strontium-90, 90-90; Isotopic Plutonium

(2) Gamma Spectroscopy (Cesium-137, Cobalt-60, Europium-152, Europium-154, Europium-155); Gamma Spec - Add-on (Americium-241, Antimony-125, Cesium-134, Radium-226, Radium-228)

4235 7961 5933

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**Matrix \***

- S - Soil
- SE - Sediment
- SO - Solid
- SL - Sludge
- W - Water
- O - Oil
- A - Air
- DS - Drum Solids
- DL - Drum Liquids
- T - Tissue
- WI - Waste
- L - Liquid
- V - Vegetation
- X - Other

|                          |                 |             |           |
|--------------------------|-----------------|-------------|-----------|
| LABORATORY SECTION       | Received By     | Title       | Date/Time |
| FINAL SAMPLE DISPOSITION | Disposal Method | Disposed By | Date/Time |

## Case Narrative

---

### 1.0 GENERAL

Thermo Nutech Sample Delivery Group H0198 is comprised of three liquid samples designated under SAF No. B98-060 with a Project Designation of : 202-S Building - Plutonium Loadout Hood - Other Liquid

The samples were received as stated on the Chain-of-Custody documents.

### 2.0 ANALYSIS NOTES

#### 2.1 Gross Alpha/Gross Beta Analyses

No problems were encountered with the gross alpha analyses. Some of the gross beta MDA's were greater than the RDL.

#### 2.2 Strontium-90 Analyses

All sample MDA's were slightly greater than the RDL, however no positive Sr-90 was detected in any of the samples.

#### 2.3 Americium-241/Curium-244 Analyses

No problems were encountered with the analyses.

#### 2.4 Neptunium-237 Analyses

No problems were encountered with the analyses.

#### 2.5 Isotopic Plutonium Analyses

No problems were encountered with the analyses.

#### 2.6 Gamma Spectroscopy Analyses

No problems were encountered with the analyses.

**TMA/RICHMOND**  
SAMPLE DELIVERY GROUP H0198

SDG 7492  
Contact N. Joseph Verville

**SAMPLE SUMMARY**

Client Hanford  
Contract TRB-SBB-207925  
Case no SDG H0198

| CLIENT SAMPLE ID       | LOCATION | MATRIX | LEVEL | LAB        | SAF NO  | CHAIN OF   | COLLECTED      |
|------------------------|----------|--------|-------|------------|---------|------------|----------------|
|                        |          |        |       | SAMPLE ID  |         | CUSTODY    |                |
| B0PPC1                 | 200 West | LIQUID |       | N808085-01 | B98-060 | B98-060-09 | 08/10/98 15:00 |
| B0PPC2                 | 200 West | LIQUID |       | N808085-02 | B98-060 | B98-060-09 | 08/10/98 15:05 |
| B0PPC3                 | 200 West | LIQUID |       | N808085-03 | B98-060 | B98-060-09 | 08/10/98 15:20 |
| Method Blank           |          | LIQUID |       | N808085-05 | B98-060 |            |                |
| Lab Control Sample     |          | LIQUID |       | N808085-04 | B98-060 |            |                |
| Duplicate (N808085-01) | 200 West | LIQUID |       | N808085-06 | B98-060 |            | 08/10/98 15:00 |
| Duplicate (N808085-02) | 200 West | LIQUID |       | N808085-07 | B98-060 |            | 08/10/98 15:05 |

**SAMPLE SUMMARY**

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**SUMMARY DATA SECTION**

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Lab id TMANC  
Protocol Hanford  
Version Ver 1.0  
Form DVD-CS  
Version 3.06  
Report date 09/16/98

## TMA/RICHMOND

SAMPLE DELIVERY GROUP H0198

SDG 7492

Contact N. Joseph Verville

## QC SUMMARY

Client HanfordContract TRB-SBB-207925Case no SDG H0198

| QC BATCH | CHAIN OF CUSTODY |  | CLIENT SAMPLE ID       | MATRIX | SOLIDS | SAMPLE AMOUNT | BASIS AMOUNT | DAYS SINCE |      | LAB SAMPLE ID | DEPARTMENT SAMPLE ID |
|----------|------------------|--|------------------------|--------|--------|---------------|--------------|------------|------|---------------|----------------------|
|          |                  |  |                        |        |        |               |              | RECEIVED   | COLL |               |                      |
| 7492     | B98-060-09       |  | B0PPC1                 | LIQUID |        |               |              | 08/18/98   | 8    | N808085-01    | 7492-001             |
|          |                  |  | B0PPC2                 | LIQUID |        |               |              | 08/18/98   | 8    | N808085-02    | 7492-002             |
|          |                  |  | B0PPC3                 | LIQUID |        |               |              | 08/18/98   | 8    | N808085-03    | 7492-003             |
|          |                  |  | Method Blank           | LIQUID |        |               |              |            |      | N808085-05    | 7492-005             |
|          |                  |  | Lab Control Sample     | LIQUID |        |               |              |            |      | N808085-04    | 7492-004             |
|          |                  |  | Duplicate (N808085-01) | LIQUID |        |               |              | 08/18/98   | 8    | N808085-06    | 7492-006             |
|          |                  |  | Duplicate (N808085-02) | LIQUID |        |               |              | 08/18/98   | 8    | N808085-07    | 7492-007             |

QC SUMMARY

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SUMMARY DATA SECTION

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Lab id TMANCProtocol HanfordVersion Ver 1.0Form DVD-QSVersion 3.06Report date 09/16/98

## TMA/RICHMOND

SAMPLE DELIVERY GROUP H0198

SDG 7492

Contact N. Joseph Verville

## PREP BATCH SUMMARY

Client HanfordContract TRB-SBB-207925Case no SDG H0198

| TEST                      | MATRIX | METHOD                         | PREPARATION | ERROR | CLIENT | MORE | PLANCHETS ANALYZED |       |     |          | QUALI-  |       |
|---------------------------|--------|--------------------------------|-------------|-------|--------|------|--------------------|-------|-----|----------|---------|-------|
|                           |        |                                | BATCH       | 2σ %  |        |      | RE                 | BLANK | LCS | DUP/ORIG | MS/ORIG | FIERS |
| Alpha Spectroscopy        |        |                                |             |       |        |      |                    |       |     |          |         |       |
| NP                        | LIQUID | Neptunium in liquids           | 2785-118    | 5.0   | 3      |      |                    | 1     | 1   | 1/1      |         |       |
| PU                        | LIQUID | Plutonium-238,239/240, Liquid  | 2785-118    | 5.0   | 3      |      |                    | 1     | 1   | 1/1      |         |       |
| TP                        | LIQUID | Americium 241/Curium in Liquid | 2785-118    | 5.0   | 3      |      |                    | 1     | 1   | 1/1      |         |       |
| Beta Counting             |        |                                |             |       |        |      |                    |       |     |          |         |       |
| SR                        | LIQUID | total Strontium in Liquid      | 2785-118    | 10.0  | 3      |      |                    | 1     | 1   | 1/1      |         |       |
| Gas Proportional Counting |        |                                |             |       |        |      |                    |       |     |          |         |       |
| 80A                       | LIQUID | Gross Alpha in Liquid Samples  | 2785-118    | 20.0  | 3      |      |                    | 1     | 1   | 1/1      |         |       |
| 80B                       | LIQUID | Gross Beta in Liquid Samples   | 2785-118    | 15.0  | 3      |      |                    | 1     | 1   | 1/1      |         |       |
| Gamma Spectroscopy        |        |                                |             |       |        |      |                    |       |     |          |         |       |
| GAM                       | LIQUID | Gamma Scan in Liquid           | 2785-118    | 10.0  | 3      |      |                    | 1     | 1   | 1/1      |         | X     |

Duplicates and Matrix Spikes are those with original (Client) sample in this Sample Delivery Group.

Blank and LCS planchets are those in the same preparation batch as some Client, Duplicate or Spike sample.

PREP BATCH SUMMARY

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SUMMARY DATA SECTION

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## TMA/RICHMOND

SAMPLE DELIVERY GROUP H0198

SDG 7492

Contact N. Joseph Verville

## WORK SUMMARY

Client HanfordContract TRB-SBB-207925Case no SDG H0198

| CLIENT SAMPLE ID   |         | LAB SAMPLE ID |          |        |          |          |          |    |                                |  |  |
|--------------------|---------|---------------|----------|--------|----------|----------|----------|----|--------------------------------|--|--|
| LOCATION           | MATRIX  | COLLECTED     |          |        | SUF-     |          |          |    |                                |  |  |
| CUSTODY            | SAF No  | RECEIVED      | PLANCHET | TEST   | FIX      | ANALYZED | REVIEWED | BY | METHOD                         |  |  |
| B0PPC1             |         | N808085-01    | 7492-001 | 80A/80 | 08/25/98 | 09/09/98 | NJV      |    | Gross Alpha in Liquid Samples  |  |  |
| 200 West           |         | 08/10/98      | 7492-001 | 80B/80 | 08/25/98 | 09/09/98 | NJV      |    | Gross Beta in Liquid Samples   |  |  |
| B98-060-09         | B98-060 | 08/18/98      | 7492-001 | GAM    | 08/26/98 | 09/09/98 | NJV      |    | Gamma Scan in Liquid           |  |  |
|                    |         |               | 7492-001 | NP     | 09/07/98 | 09/09/98 | NJV      |    | Neptunium in liquids           |  |  |
|                    |         |               | 7492-001 | PU     | 08/27/98 | 09/09/98 | NJV      |    | Plutonium-238,239/240, Liquid  |  |  |
|                    |         |               | 7492-001 | SR     | 08/27/98 | 09/09/98 | NJV      |    | total Strontium in Liquid      |  |  |
|                    |         |               | 7492-001 | TP     | 09/02/98 | 09/09/98 | NJV      |    | Americium 241/Curium in Liquid |  |  |
| B0PPC2             |         | N808085-02    | 7492-002 | 80A/80 | 08/27/98 | 09/09/98 | NJV      |    | Gross Alpha in Liquid Samples  |  |  |
| 200 West           |         | 08/10/98      | 7492-002 | 80B/80 | 08/27/98 | 09/09/98 | NJV      |    | Gross Beta in Liquid Samples   |  |  |
| B98-060-09         | B98-060 | 08/18/98      | 7492-002 | GAM    | 08/26/98 | 09/09/98 | NJV      |    | Gamma Scan in Liquid           |  |  |
|                    |         |               | 7492-002 | NP     | 09/07/98 | 09/09/98 | NJV      |    | Neptunium in liquids           |  |  |
|                    |         |               | 7492-002 | PU     | 08/27/98 | 09/09/98 | NJV      |    | Plutonium-238,239/240, Liquid  |  |  |
|                    |         |               | 7492-002 | SR     | 08/27/98 | 09/09/98 | NJV      |    | total Strontium in Liquid      |  |  |
|                    |         |               | 7492-002 | TP     | 09/02/98 | 09/09/98 | NJV      |    | Americium 241/Curium in Liquid |  |  |
| B0PPC3             |         | N808085-03    | 7492-003 | 80A/80 | 08/25/98 | 09/09/98 | NJV      |    | Gross Alpha in Liquid Samples  |  |  |
| 200 West           |         | 08/10/98      | 7492-003 | 80B/80 | 08/25/98 | 09/09/98 | NJV      |    | Gross Beta in Liquid Samples   |  |  |
| B98-060-09         | B98-060 | 08/18/98      | 7492-003 | GAM    | 08/26/98 | 09/09/98 | NJV      |    | Gamma Scan in Liquid           |  |  |
|                    |         |               | 7492-003 | NP     | 09/07/98 | 09/09/98 | NJV      |    | Neptunium in liquids           |  |  |
|                    |         |               | 7492-003 | PU     | 08/27/98 | 09/09/98 | NJV      |    | Plutonium-238,239/240, Liquid  |  |  |
|                    |         |               | 7492-003 | SR     | 08/27/98 | 09/09/98 | NJV      |    | total Strontium in Liquid      |  |  |
|                    |         |               | 7492-003 | TP     | 09/02/98 | 09/09/98 | NJV      |    | Americium 241/Curium in Liquid |  |  |
| Method Blank       |         | N808085-05    | 7492-005 | 80A/80 | 08/26/98 | 09/09/98 | NJV      |    | Gross Alpha in Liquid Samples  |  |  |
|                    |         |               | 7492-005 | 80B/80 | 08/26/98 | 09/09/98 | NJV      |    | Gross Beta in Liquid Samples   |  |  |
|                    | B98-060 |               | 7492-005 | GAM    | 08/27/98 | 09/09/98 | NJV      |    | Gamma Scan in Liquid           |  |  |
|                    |         |               | 7492-005 | NP     | 09/07/98 | 09/09/98 | NJV      |    | Neptunium in liquids           |  |  |
|                    |         |               | 7492-005 | PU     | 08/27/98 | 09/09/98 | NJV      |    | Plutonium-238,239/240, Liquid  |  |  |
|                    |         |               | 7492-005 | SR     | 08/27/98 | 09/09/98 | NJV      |    | total Strontium in Liquid      |  |  |
|                    |         |               | 7492-005 | TP     | 09/02/98 | 09/09/98 | NJV      |    | Americium 241/Curium in Liquid |  |  |
| Lab Control Sample |         | N808085-04    | 7492-004 | 80A/80 | 08/25/98 | 09/09/98 | NJV      |    | Gross Alpha in Liquid Samples  |  |  |
|                    |         |               | 7492-004 | 80B/80 | 08/25/98 | 09/09/98 | NJV      |    | Gross Beta in Liquid Samples   |  |  |
|                    | B98-060 |               | 7492-004 | GAM    | 08/27/98 | 09/09/98 | NJV      |    | Gamma Scan in Liquid           |  |  |
|                    |         |               | 7492-004 | NP     | 09/07/98 | 09/09/98 | NJV      |    | Neptunium in liquids           |  |  |
|                    |         |               | 7492-004 | PU     | 08/27/98 | 09/09/98 | NJV      |    | Plutonium-238,239/240, Liquid  |  |  |
|                    |         |               | 7492-004 | SR     | 08/27/98 | 09/09/98 | NJV      |    | total Strontium in Liquid      |  |  |
|                    |         |               | 7492-004 | TP     | 09/02/98 | 09/09/98 | NJV      |    | Americium 241/Curium in Liquid |  |  |

WORK SUMMARY

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SUMMARY DATA SECTION

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Lab id TMANCProtocol HanfordVersion Ver 1.0Form DVD-CWSVersion 3.06Report date 09/16/98

## TMA/RICHMOND

SAMPLE DELIVERY GROUP H0198

SDG 7492

Contact N. Joseph Verville

## WORK SUMMARY, cont.

Client HanfordContract TRB-SBB-207925Case no SDG H0198

| CLIENT SAMPLE ID       |         | LAB SAMPLE ID |          |        |     |          |          |     |                                |  |  |  |  |
|------------------------|---------|---------------|----------|--------|-----|----------|----------|-----|--------------------------------|--|--|--|--|
| LOCATION               | MATRIX  | COLLECTED     |          | SUF-   |     |          |          |     |                                |  |  |  |  |
| CUSTODY                | SAF No  | RECEIVED      | PLANCHET | TEST   | FIX | ANALYZED | REVIEWED | BY  | METHOD                         |  |  |  |  |
| Duplicate (N808085-01) |         | N808085-06    | 7492-006 | GAM    |     | 08/27/98 | 09/09/98 | NJV | Gamma Scan in Liquid           |  |  |  |  |
| 200 West               | LIQUID  | 08/10/98      | 7492-006 | PU     |     | 08/27/98 | 09/09/98 | NJV | Plutonium-238,239/240, Liquid  |  |  |  |  |
|                        | B98-060 | 08/18/98      | 7492-006 | SR     |     | 08/27/98 | 09/09/98 | NJV | total Strontium in Liquid      |  |  |  |  |
|                        |         |               | 7492-006 | TP     |     | 09/02/98 | 09/09/98 | NJV | Americium 241/Curium in Liquid |  |  |  |  |
| Duplicate (N808085-02) |         | N808085-07    | 7492-007 | 80A/80 |     | 08/26/98 | 09/09/98 | NJV | Gross Alpha in Liquid Samples  |  |  |  |  |
| 200 West               | LIQUID  | 08/10/98      | 7492-007 | 80B/80 |     | 08/26/98 | 09/09/98 | NJV | Gross Beta in Liquid Samples   |  |  |  |  |
|                        | B98-060 | 08/18/98      | 7492-007 | NP     |     | 09/07/98 | 09/09/98 | NJV | Neptunium in liquids           |  |  |  |  |

## COUNTS OF TESTS BY SAMPLE TYPE

| TEST   | SAF No  | METHOD                         | REFERENCE  | CLIENT | MORE | RE | BLANK | LCS | DUP | SPIKE | TOTAL |
|--------|---------|--------------------------------|------------|--------|------|----|-------|-----|-----|-------|-------|
| 80A/80 | B98-060 | Gross Alpha in Liquid Samples  | EPA900.0   | 3      |      |    | 1     | 1   | 1   |       | 6     |
| 80B/80 | B98-060 | Gross Beta in Liquid Samples   | EPA900.0   | 3      |      |    | 1     | 1   | 1   |       | 6     |
| GAM    | B98-060 | Gamma Scan in Liquid           | GAMMAHI    | 3      |      |    | 1     | 1   | 1   |       | 6     |
| NP     | B98-060 | Neptunium in liquids           | NP237PLATE | 3      |      |    | 1     | 1   | 1   |       | 6     |
| PU     | B98-060 | Plutonium-238,239/240, Liquid  | PUPLATE    | 3      |      |    | 1     | 1   | 1   |       | 6     |
| SR     | B98-060 | total Strontium in Liquid      | SR8990     | 3      |      |    | 1     | 1   | 1   |       | 6     |
| TP     | B98-060 | Americium 241/Curium in Liquid |            | 3      |      |    | 1     | 1   | 1   |       | 6     |
| TOTALS |         |                                |            | 21     |      |    | 7     | 7   | 7   |       | 42    |

WORK SUMMARY

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Lab id TMANCProtocol HanfordVersion Ver 1.0Form DVD-CWSVersion 3.06Report date 09/16/98

**TMA / RICHMOND**  
**SAMPLE DELIVERY GROUP H0198**

**N808085-05**

**Method Blank**

**METHOD BLANK**

|                                   |                                      |                  |
|-----------------------------------|--------------------------------------|------------------|
| SDG <u>7492</u>                   | Client/Case no <u>Hanford</u>        | SDG <u>H0198</u> |
| Contact <u>N. Joseph Verville</u> | Case no <u>TRB-SBB-207925</u>        |                  |
| Lab sample id <u>N808085-05</u>   | Client sample id <u>Method Blank</u> |                  |
| Dept sample id <u>7492-005</u>    | Material/Matrix <u>LIQUID</u>        |                  |
|                                   | SAF No <u>B98-060</u>                |                  |

| ANALYTE             | CAS NO     | RESULT<br>pCi/L | 2σ ERR<br>(COUNT) | MDA<br>pCi/L | RDL<br>pCi/L | QUALI-<br>FIERS | TEST |
|---------------------|------------|-----------------|-------------------|--------------|--------------|-----------------|------|
| Gross Alpha         | 12587-46-1 | -0.21           | 1.2               | 2.9          | 3.0          | U               | 80A  |
| Gross Beta          | 12587-47-2 | -1.9            | 3.4               | 6.2          | 4.0          | U               | 80B  |
| Curium 244          | 13981-15-2 | 0               | 0.056             | 0.14         |              | U               | TP   |
| Plutonium 238       | 13981-16-3 | 0.090           | 0.078             | 0.099        | 1.0          | U               | PU   |
| Plutonium 239/240   | 15117-48-3 | 0.13            | 0.078             | 0.099        | 1.0          | J               | PU   |
| Americium 241       | 14596-10-2 | 0.028           | 0.085             | 0.11         |              | U               | TP   |
| Total Strontium     | SR-89/90   | -0.64           | 1.8               | 2.3          | 2.0          | U               | SR   |
| Neptunium 237       | NP237PLATE | 0.077           | 0.077             | 0.15         |              | U               | NP   |
| GAMMA SCAN ANALYTES |            | U               |                   |              |              |                 |      |
| Potassium 40        | 13966-00-2 | U               |                   | 220          |              | U               | GAM  |
| Cobalt 60           | 10198-40-0 | U               |                   | 15           | 25           | U               | GAM  |
| Cesium 137          | 10045-97-3 | U               |                   | 13           | 15           | U               | GAM  |
| Europium 152        | 14683-23-9 | U               |                   | 36           | 50           | U               | GAM  |
| Europium 154        | 15585-10-1 | U               |                   | 40           | 50           | U               | GAM  |
| Europium 155        | 14391-16-3 | U               |                   | 33           | 50           | U               | GAM  |
| Americium 241       | 14596-10-2 | U               |                   | 41           |              | U               | GAM  |
| Uranium 238         | U-238      | U               |                   | 1700         |              | U               | GAM  |
| Uranium 235         | U-235      | U               |                   | 48           |              | U               | GAM  |

202-S Bldg-Pu Loadout Hood-Other Liq

QC-BLANK 28921

## TMA/RICHMOND

SAMPLE DELIVERY GROUP H0198

N808085-04

## LAB CONTROL SAMPLE

Lab Control Sample

SDG 7492

Contact N. Joseph VervilleClient/Case no Hanford SDG H0198Case no TRB-SBB-207925Lab sample id N808085-04Dept sample id 7492-004Client sample id Lab Control SampleMaterial/Matrix LIQUIDSAF No B98-060

| ANALYTE             | RESULT<br>pCi/L | 2σ ERR<br>(COUNT) | MDA<br>pCi/L | RDL<br>pCi/L | QUALI-<br>FIERS | TEST | ADDED<br>pCi/L | 2σ ERR<br>pCi/L | REC<br>% | 3σ LMTS<br>(TOTAL) | PROTOCOL<br>LIMITS |
|---------------------|-----------------|-------------------|--------------|--------------|-----------------|------|----------------|-----------------|----------|--------------------|--------------------|
| Gross Alpha         | 190             | 7.3               | 1.5          | 3.0          |                 | 80A  | 192            | 7.7             | 99       | 69-131             | 80-120             |
| Gross Beta          | 210             | 5.6               | 3.8          | 4.0          |                 | 80B  | 224            | 9.0             | 94       | 78-122             | 80-120             |
| Curium 244          | 51              | 3.0               | 0.10         |              |                 | TP   | 55.6           | 2.2             | 92       | 88-112             |                    |
| Plutonium 238       | 46              | 2.9               | 0.099        | 1.0          |                 | PU   | 50.6           | 2.0             | 91       | 87-113             | 80-120             |
| Plutonium 239/240   | 49              | 3.1               | 0.12         | 1.0          | B               | PU   | 53.0           | 2.1             | 92       | 87-113             | 80-120             |
| Americium 241       | 45              | 2.7               | 0.13         |              |                 | TP   | 48.0           | 1.9             | 94       | 87-113             |                    |
| Total Strontium     | 110             | 5.2               | 2.6          | 2.0          |                 | SR   | 108            | 4.3             | 102      | 81-119             |                    |
| Neptunium 237       | 52              | 2.0               | 0.099        |              |                 | NP   | 52.9           | 2.1             | 98       | 89-111             |                    |
| GAMMA SCAN ANALYTES |                 |                   |              |              |                 |      |                |                 |          |                    |                    |
| Cobalt 60           | 540             | 44                | 22           | 25           |                 | GAM  | 498            | 20              | 108      | 78-122             | 80-120             |
| Cesium 137          | 660             | 41                | 29           | 15           |                 | GAM  | 582            | 23              | 113      | 79-121             | 80-120             |

202-S Bldg-Pu Loadout Hood-Other Liq

QC-LCS 28920

LAB CONTROL SAMPLES

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SUMMARY DATA SECTION

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Lab id TMANCProtocol HanfordVersion Ver 1.0Form DVD-LCSVersion 3.06Report date 09/16/98

**TMA/RICHMOND**  
SAMPLE DELIVERY GROUP H0198

N808085-06

B0PPC1

**DUPLICATE**

|                                   |                                 |   |  |                  |
|-----------------------------------|---------------------------------|---|--|------------------|
| SDG <u>7492</u>                   |                                 | Client/Case no <u>Hanford</u>                   |  | SDG <u>H0198</u> |
| Contact <u>N. Joseph Verville</u> |                                 | Case no <u>TRB-SBB-207925</u>                   |  |                  |
| <b>DUPLICATE</b>                  |                                 | <b>ORIGINAL</b>                                 |  |                  |
| Lab sample id <u>N808085-06</u>   | Lab sample id <u>N808085-01</u> | Client sample id <u>B0PPC1</u>                  |  |                  |
| Dept sample id <u>7492-006</u>    | Dept sample id <u>7492-001</u>  | Location/Matrix <u>200 West</u> <u>LIQUID</u>   |  |                  |
|                                   | Received <u>08/18/98</u>        | Collected <u>08/10/98 15:00</u>                 |  |                  |
|                                   |                                 | Custody/SAF No <u>B98-060-09</u> <u>B98-060</u> |  |                  |

| ANALYTE             | DUPLICATE<br>pCi/L | 2σ ERR<br>(COUNT) | MDA<br>pCi/L | RDL<br>pCi/L | QUALI-<br>FIERS | TEST | ORIGINAL<br>pCi/L | 2σ ERR<br>(COUNT) | MDA<br>pCi/L | QUALI-<br>FIERS | RPD<br>% | 3σ PROT<br>TOT LIMIT |
|---------------------|--------------------|-------------------|--------------|--------------|-----------------|------|-------------------|-------------------|--------------|-----------------|----------|----------------------|
| Curium 244          | 0.21               | 0.12              | 0.12         |              |                 | TP   | 0                 | 0.080             | 0.15         | U               | 200      | 207                  |
| Plutonium 238       | 0                  | 0.025             | 0.095        | 1.0          | U               | PU   | 0.14              | 0.14              | 0.25         | U               | -        |                      |
| Plutonium 239/240   | -0.025             | 0.025             | 0.12         | 1.0          | U               | PU   | 0                 | 0.11              | 0.22         | U               | -        |                      |
| Americium 241       | 0.20               | 0.12              | 0.12         |              |                 | TP   | 0.027             | 0.080             | 0.10         | U               | 152      | 191                  |
| Total Strontium     | 0.095              | 1.8               | <u>2.2</u>   | 2.0          | U               | SR   | 0.58              | 1.8               | <u>2.2</u>   | U               | -        |                      |
| GAMMA SCAN ANALYTES | U                  |                   |              |              |                 |      | U                 |                   |              |                 |          |                      |
| Potassium 40        | U                  |                   | 81           |              | UX              | GAM  | U                 |                   | 180          | U               | -        |                      |
| Cobalt 60           | U                  |                   | 5.9          | 25           | UX              | GAM  | U                 |                   | 19           | U               | -        |                      |
| Cesium 137          | U                  |                   | 5.5          | 15           | UX              | GAM  | U                 |                   | <u>16</u>    | U               | -        |                      |
| Europium 152        | U                  |                   | 16           | 50           | UX              | GAM  | U                 |                   | 45           | U               | -        |                      |
| Europium 154        | U                  |                   | 21           | 50           | UX              | GAM  | U                 |                   | <u>56</u>    | U               | -        |                      |
| Europium 155        | U                  |                   | 15           | 50           | UX              | GAM  | U                 |                   | 27           | U               | -        |                      |
| Americium 241       | U                  |                   | 16           |              | UX              | GAM  | U                 |                   | 17           | U               | -        |                      |
| Uranium 238         | U                  |                   | 720          |              | UX              | GAM  | U                 |                   | 2300         | U               | -        |                      |
| Uranium 235         | U                  |                   | 22           |              | UX              | GAM  | U                 |                   | 51           | U               | -        |                      |

202-S Bldg-Pu Loadout Hood-Other Liq

QC-DUP#1 28922

DUPLICATES

Page 1

SUMMARY DATA SECTION

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Lab id TMANC  
Protocol Hanford  
Version Ver 1.0  
Form DVD-DUP  
Version 3.06  
Report date 09/16/98

## TMA/RICHMOND

SAMPLE DELIVERY GROUP H0198

N808085-07

B0PPC2

DUPLICATE

SDG 7492Contact N. Joseph Verville

DUPLICATE

Lab sample id N808085-07Dept sample id 7492-007

ORIGINAL

Lab sample id N808085-02Dept sample id 7492-002Received 08/18/98Client/Case no Hanford SDG H0198Case no TRB-SBB-207925Client sample id B0PPC2Location/Matrix 200 West LIQUIDCollected 08/10/98 15:05Custody/SAF No B98-060-09 B98-060

| ANALYTE       | DUPLICATE<br>pCi/L | 2σ ERR<br>(COUNT) | MDA<br>pCi/L | RDL<br>pCi/L | QUALI-<br>FIERS | TEST | ORIGINAL<br>pCi/L | 2σ ERR<br>(COUNT) | MDA<br>pCi/L | QUALI-<br>FIERS | RPD<br>% | 3σ<br>TOT | PROT<br>LIMIT |
|---------------|--------------------|-------------------|--------------|--------------|-----------------|------|-------------------|-------------------|--------------|-----------------|----------|-----------|---------------|
| Gross Alpha   | -0.31              | 0.97              | 2.4          | 3.0          | U               | 80A  | 0.41              | 1.2               | 2.2          | U               | -        |           |               |
| Gross Beta    | -2.6               | 3.6               | 6.4          | 4.0          | U               | 80B  | -0.071            | 3.3               | 5.6          | U               | -        |           |               |
| Neptunium 237 | 0                  | 0.044             | 0.11         |              | U               | NP   | 0.040             | 0.081             | 0.14         | U               | -        |           |               |

202-S Bldg-Pu Loadout Hood-Other Liq

QC-DUP#2 28990

DUPLICATES

Page 2

SUMMARY DATA SECTION

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Lab id TMANCProtocol HanfordVersion Ver 1.0Form DVD-DUPVersion 3.06Report date 09/16/98

**TMA / RICHMOND**  
**SAMPLE DELIVERY GROUP H0198**

**N808085-01**

**B0PPC1**

**DATA SHEET**

|                                   |                                  |                  |
|-----------------------------------|----------------------------------|------------------|
| SDG <u>7492</u>                   | Client/Case no <u>Hanford</u>    | SDG <u>H0198</u> |
| Contact <u>N. Joseph Verville</u> | Case no <u>TRB-SBB-207925</u>    |                  |
| Lab sample id <u>N808085-01</u>   | Client sample id <u>B0PPC1</u>   |                  |
| Dept sample id <u>7492-001</u>    | Location/Matrix <u>200 West</u>  | <u>LIQUID</u>    |
| Received <u>08/18/98</u>          | Collected <u>08/10/98 15:00</u>  |                  |
|                                   | Custody/SAF No <u>B98-060-09</u> | <u>B98-060</u>   |

| ANALYTE             | CAS NO     | RESULT<br>pCi/L | 2σ ERR<br>(COUNT) | MDA<br>pCi/L | RDL<br>pCi/L | QUALI-<br>FIERS | TEST |
|---------------------|------------|-----------------|-------------------|--------------|--------------|-----------------|------|
| Gross Alpha         | 12587-46-1 | -0.30           | 0.53              | 1.1          | 3.0          | U               | 80A  |
| Gross Beta          | 12587-47-2 | -1.0            | 1.7               | 2.8          | 4.0          | U               | 80B  |
| Curium 244          | 13981-15-2 | 0               | 0.080             | 0.15         |              | U               | TP   |
| Plutonium 238       | 13981-16-3 | 0.14            | 0.14              | 0.25         | 1.0          | U               | PU   |
| Plutonium 239/240   | 15117-48-3 | 0               | 0.11              | 0.22         | 1.0          | U               | PU   |
| Americium 241       | 14596-10-2 | 0.027           | 0.080             | 0.10         |              | U               | TP   |
| Total Strontium     | SR-89/90   | 0.58            | 1.8               | <u>2.2</u>   | 2.0          | U               | SR   |
| Neptunium 237       | NP237PLATE | -0.012          | 0.069             | 0.17         |              | U               | NP   |
| GAMMA SCAN ANALYTES |            | U               |                   |              |              |                 |      |
| Potassium 40        | 13966-00-2 | U               |                   | 180          |              | U               | GAM  |
| Cobalt 60           | 10198-40-0 | U               |                   | 19           | 25           | U               | GAM  |
| Cesium 137          | 10045-97-3 | U               |                   | <u>16</u>    | 15           | U               | GAM  |
| Europium 152        | 14683-23-9 | U               |                   | 45           | 50           | U               | GAM  |
| Europium 154        | 15585-10-1 | U               |                   | <u>56</u>    | 50           | U               | GAM  |
| Europium 155        | 14391-16-3 | U               |                   | 27           | 50           | U               | GAM  |
| Americium 241       | 14596-10-2 | U               |                   | 17           |              | U               | GAM  |
| Uranium 238         | U-238      | U               |                   | 2300         |              | U               | GAM  |
| Uranium 235         | U-235      | U               |                   | 51           |              | U               | GAM  |

202-S Bldg-Pu Loadout Hood-Other Liq

**TMA / RICHMOND**  
**SAMPLE DELIVERY GROUP H0198**

**N808085-02**

**B0PPC2**

**DATA SHEET**

|                                   |                                  |                  |
|-----------------------------------|----------------------------------|------------------|
| SDG <u>7492</u>                   | Client/Case no <u>Hanford</u>    | SDG <u>H0198</u> |
| Contact <u>N. Joseph Verville</u> | Case no <u>TRB-SBB-207925</u>    |                  |
| Lab sample id <u>N808085-02</u>   | Client sample id <u>B0PPC2</u>   |                  |
| Dept sample id <u>7492-002</u>    | Location/Matrix <u>200 West</u>  | <u>LIQUID</u>    |
| Received <u>08/18/98</u>          | Collected <u>08/10/98 15:05</u>  |                  |
|                                   | Custody/SAF No <u>B98-060-09</u> | <u>B98-060</u>   |

| ANALYTE             | CAS NO     | RESULT<br>pCi/L | 2σ ERR<br>(COUNT) | MDA<br>pCi/L | RDL<br>pCi/L | QUALI-<br>FIERS | TEST |
|---------------------|------------|-----------------|-------------------|--------------|--------------|-----------------|------|
| Gross Alpha         | 12587-46-1 | 0.41            | 1.2               | 2.2          | 3.0          | U               | 80A  |
| Gross Beta          | 12587-47-2 | -0.071          | 3.3               | 5.6          | 4.0          | U               | 80B  |
| Curium 244          | 13981-15-2 | 0.10            | 0.089             | 0.11         |              | U               | TP   |
| Plutonium 238       | 13981-16-3 | 0.039           | 0.078             | 0.15         | 1.0          | U               | PU   |
| Plutonium 239/240   | 15117-48-3 | 0.020           | 0.078             | 0.15         | 1.0          | U               | PU   |
| Americium 241       | 14596-10-2 | 0.015           | 0.059             | 0.11         |              | U               | TP   |
| Total Strontium     | SR-89/90   | 0.20            | 1.6               | 2.0          | 2.0          | U               | SR   |
| Neptunium 237       | NP237PLATE | 0.040           | 0.081             | 0.14         |              | U               | NP   |
| GAMMA SCAN ANALYTES |            | U               |                   |              |              |                 |      |
| Potassium 40        | 13966-00-2 | U               |                   | 230          |              | U               | GAM  |
| Cobalt 60           | 10198-40-0 | U               |                   | 18           | 25           | U               | GAM  |
| Cesium 137          | 10045-97-3 | U               |                   | 16           | 15           | U               | GAM  |
| Europium 152        | 14683-23-9 | U               |                   | 38           | 50           | U               | GAM  |
| Europium 154        | 15585-10-1 | U               |                   | 54           | 50           | U               | GAM  |
| Europium 155        | 14391-16-3 | U               |                   | 36           | 50           | U               | GAM  |
| Americium 241       | 14596-10-2 | U               |                   | 45           |              | U               | GAM  |
| Uranium 238         | U-238      | U               |                   | 1800         |              | U               | GAM  |
| Uranium 235         | U-235      | U               |                   | 54           |              | U               | GAM  |

202-S Bldg-Pu Loadout Hood-Other Liq

**DATA SHEETS**

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**SUMMARY DATA SECTION**

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|                             |
|-----------------------------|
| Lab id <u>TMANC</u>         |
| Protocol <u>Hanford</u>     |
| Version <u>Ver 1.0</u>      |
| Form <u>DVD-DS</u>          |
| Version <u>3.06</u>         |
| Report date <u>09/16/98</u> |

**TMA / RICHMOND**  
**SAMPLE DELIVERY GROUP H0198**

**N808085-03**

**B0PPC3**

**DATA SHEET**

|                                   |                                  |                  |
|-----------------------------------|----------------------------------|------------------|
| SDG <u>7492</u>                   | Client/Case no <u>Hanford</u>    | SDG <u>H0198</u> |
| Contact <u>N. Joseph Verville</u> | Case no <u>TRB-SBB-207925</u>    |                  |
| Lab sample id <u>N808085-03</u>   | Client sample id <u>B0PPC3</u>   |                  |
| Dept sample id <u>7492-003</u>    | Location/Matrix <u>200 West</u>  | <u>LIQUID</u>    |
| Received <u>08/18/98</u>          | Collected <u>08/10/98 15:20</u>  |                  |
|                                   | Custody/SAF No <u>B98-060-09</u> | <u>B98-060</u>   |

| ANALYTE             | CAS NO     | RESULT<br>pCi/L | 2σ ERR<br>(COUNT) | MDA<br>pCi/L | RDL<br>pCi/L | QUALI-<br>FIERS | TEST |
|---------------------|------------|-----------------|-------------------|--------------|--------------|-----------------|------|
| Gross Alpha         | 12587-46-1 | -0.44           | 0.64              | 1.3          | 3.0          | U               | 80A  |
| Gross Beta          | 12587-47-2 | -0.89           | 1.6               | 2.8          | 4.0          | U               | 80B  |
| Curium 244          | 13981-15-2 | 0.013           | 0.053             | 0.10         |              | U               | TP   |
| Plutonium 238       | 13981-16-3 | -0.013          | 0.077             | 0.16         | 1.0          | U               | PU   |
| Plutonium 239/240   | 15117-48-3 | -0.013          | 0.077             | 0.16         | 1.0          | U               | PU   |
| Americium 241       | 14596-10-2 | -0.013          | 0.052             | 0.10         |              | U               | TP   |
| Total Strontium     | SR-89/90   | -0.92           | 2.0               | <u>2.5</u>   | 2.0          | U               | SR   |
| Neptunium 237       | NP237PLATE | 0.058           | <u>0.077</u>      | 0.058        |              |                 | NP   |
| GAMMA SCAN ANALYTES |            | U               |                   |              |              |                 |      |
| Potassium 40        | 13966-00-2 | U               |                   | 170          |              | U               | GAM  |
| Cobalt 60           | 10198-40-0 | U               |                   | 7.6          | 25           | U               | GAM  |
| Cesium 137          | 10045-97-3 | U               |                   | 6.0          | 15           | U               | GAM  |
| Europium 152        | 14683-23-9 | U               |                   | 18           | 50           | U               | GAM  |
| Europium 154        | 15585-10-1 | U               |                   | 20           | 50           | U               | GAM  |
| Europium 155        | 14391-16-3 | U               |                   | 17           | 50           | U               | GAM  |
| Americium 241       | 14596-10-2 | U               |                   | 17           |              | U               | GAM  |
| Uranium 238         | U-238      | U               |                   | 850          |              | U               | GAM  |
| Uranium 235         | U-235      | U               |                   | 24           |              | U               | GAM  |

202-S Bldg-Pu Loadout Hood-Other Liq

**DATA SHEETS**

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**SUMMARY DATA SECTION**

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|                             |
|-----------------------------|
| Lab id <u>TMANC</u>         |
| Protocol <u>Hanford</u>     |
| Version <u>Ver 1.0</u>      |
| Form <u>DVD-DS</u>          |
| Version <u>3.06</u>         |
| Report date <u>09/16/98</u> |

## TMA/RICHMOND

SAMPLE DELIVERY GROUP H0198

Test NP Matrix LIQUIDSDG 7492Contact N. Joseph Verville

## METHOD SUMMARY

NEPTUNIUM IN LIQUIDS

ALPHA SPECTROSCOPY

Client HanfordContract TRB-SBB-207925Case no SDG H0198

## RESULTS

| CLIENT SAMPLE ID | LAB<br>SAMPLE ID | RAW<br>TEST FIX | SUF-<br>PLANCHET | Neptunium<br>237 |
|------------------|------------------|-----------------|------------------|------------------|
|------------------|------------------|-----------------|------------------|------------------|

Preparation batch 2785-118

|                        |            |          |       |
|------------------------|------------|----------|-------|
| B0PPC1                 | N808085-01 | 7492-001 | U     |
| B0PPC2                 | N808085-02 | 7492-002 | U     |
| B0PPC3                 | N808085-03 | 7492-003 | 0.058 |
| BLK (QC ID=28921)      | N808085-05 | 7492-005 | U     |
| LCS (QC ID=28920)      | N808085-04 | 7492-004 | ok    |
| Duplicate (N808085-02) | N808085-07 | 7492-007 | - U   |

Nominal values and limits from method RDLs (pCi/L)

202-S Bldg-Pu Loadout Hood-Other Liq

## METHOD PERFORMANCE

| CLIENT SAMPLE ID | LAB<br>SAMPLE ID | RAW<br>TEST FIX | SUF-<br>pCi/L | MDA<br>L | ALIQ<br>L | PREP<br>FAC | DILU-<br>TION | YIELD<br>% | EFF<br>% | COUNT<br>min | FWHM<br>keV | DRIFT<br>KeV | DAYS<br>HELD | ANAL-<br>PREPARED | YZED | DETECTOR |
|------------------|------------------|-----------------|---------------|----------|-----------|-------------|---------------|------------|----------|--------------|-------------|--------------|--------------|-------------------|------|----------|
|------------------|------------------|-----------------|---------------|----------|-----------|-------------|---------------|------------|----------|--------------|-------------|--------------|--------------|-------------------|------|----------|

Preparation batch 2785-118 2σ prep error 5.0 % Reference Lab Notebook #2785 pg. 118

|   |            |       |       |    |      |    |          |       |        |
|---|------------|-------|-------|----|------|----|----------|-------|--------|
| B0PPC1                                  | N808085-01 | 0.17  | 0.100 | 58 | 1812 | 28 | 09/04/98 | 09/07 | SS-009 |
| B0PPC2                                  | N808085-02 | 0.14  | 0.100 | 64 | 1812 | 28 | 09/04/98 | 09/07 | SS-010 |
| B0PPC3                                  | N808085-03 | 0.058 | 0.100 | 35 | 1812 | 28 | 09/04/98 | 09/07 | SS-011 |
| BLK (QC ID=28921)                       | N808085-05 | 0.15  | 0.100 | 34 | 1812 |    | 09/04/98 | 09/07 | SS-013 |
| LCS (QC ID=28920)                       | N808085-04 | 0.099 | 0.100 | 51 | 1812 |    | 09/04/98 | 09/07 | SS-012 |
| Duplicate (N808085-02)<br>(QC ID=28922) | N808085-07 | 0.11  | 0.100 | 58 | 1812 | 28 | 09/04/98 | 09/07 | SS-014 |

Nominal values and limits from method

0.100

20-105

100

PROCEDURES REFERENCE NP237PLATE

EP-930

Neptunium Purification, rev 0

AVERAGES ± 2 SD

FOR 6 SAMPLES

MDA 0.12 ± 0.081

YIELD 50 ± 25

## METHOD SUMMARIES

Page 1

## SUMMARY DATA SECTION

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Lab id TMANCProtocol HanfordVersion Ver 1.0Form DVD-CMSVersion 3.06Report date 09/16/98

## TMA/RICHMOND

SAMPLE DELIVERY GROUP H0198

Test PU Matrix LIQUID  
 SDG 7492  
 Contact N. Joseph Verville

## METHOD SUMMARY

PLUTONIUM-238,239/240, LIQUID  
 ALPHA SPECTROSCOPY

Client Hanford  
 Contract TRB-SBB-207925  
 Case no SDG H0198

## RESULTS

| CLIENT SAMPLE ID           | LAB<br>SAMPLE ID | RAW<br>TEST FIX | SUF-<br>PLANCHET | Plutonium<br>238 | Plutonium<br>239/240 |
|----------------------------|------------------|-----------------|------------------|------------------|----------------------|
| Preparation batch 2785-118 |                  |                 |                  |                  |                      |
| BOPPC1                     | N808085-01       | 7492-001        |                  | U                | U                    |
| BOPPC2                     | N808085-02       | 7492-002        |                  | U                | U                    |
| BOPPC3                     | N808085-03       | 7492-003        |                  | U                | U                    |
| BLK (QC ID=28921)          | N808085-05       | 7492-005        |                  | U                | 0.13 J               |
| LCS (QC ID=28920)          | N808085-04       | 7492-004        |                  | ok               | ok                   |
| Duplicate (N808085-01)     | N808085-06       | 7492-006        |                  | - U              | - U                  |

Nominal values and limits from method RDLs (pCi/L) 1.0 1.0  
 202-S Bldg-Pu Loadout Hood-Other Liq

## METHOD PERFORMANCE

| CLIENT SAMPLE ID  | LAB<br>SAMPLE ID | RAW<br>TEST FIX | SUF-<br>pCi/L | MAX MDA | ALIQ<br>L | PREP<br>FAC | DILU-<br>TION | YIELD<br>% | EFF<br>% | COUNT<br>min | FWHM<br>keV | DRIFT<br>KeV | DAYS<br>HELD | ANAL-<br>PREPARED | YZED   | DETECTOR |
|---|------------------|-----------------|---------------|---------|-----------|-------------|---------------|------------|----------|--------------|-------------|--------------|--------------|-------------------|--------|----------|
| Preparation batch 2785-118 2σ prep error 5.0 % Reference Lab Notebook #2785 pg. 118 |                  |                 |               |         |           |             |               |            |          |              |             |              |              |                   |        |          |
| BOPPC1  | N808085-01       |                 | 0.25          | 0.100   |           |             |               | 62         | 1086     |              |             | 17           | 08/27/98     | 08/27             | SS-009 |          |
| BOPPC2  | N808085-02       |                 | 0.15          | 0.100   |           |             |               | 54         | 1086     |              |             | 17           | 08/27/98     | 08/27             | SS-010 |          |
| BOPPC3  | N808085-03       |                 | 0.16          | 0.100   |           |             |               | 86         | 1086     |              |             | 17           | 08/27/98     | 08/27             | SS-011 |          |
| BLK (QC ID=28921)   | N808085-05       |                 | 0.099         | 0.100   |           |             |               | 85         | 1086     |              |             |              | 08/27/98     | 08/27             | SS-015 |          |
| LCS (QC ID=28920)   | N808085-04       |                 | 0.12          | 0.100   |           |             |               | 83         | 1086     |              |             |              | 08/27/98     | 08/27             | SS-012 |          |
| Duplicate (N808085-01)  | N808085-06       |                 | 0.12          | 0.100   |           |             |               | 88         | 1086     |              |             | 17           | 08/27/98     | 08/27             | SS-016 |          |
| (QC ID=28922)   |                  |                 |               |         |           |             |               |            |          |              |             |              |              |                   |        |          |
| Nominal values and limits from method   |                  |                 | 1.0           | 0.100   |           |             |               | 700        | 180      |              |             |              |              |                   |        |          |

| PROCEDURES | REFERENCE | PUPLATE                                       |
|------------|-----------|---|
| RP-070     |           | Sample Dissolution - HF Method, rev 0         |
| RP-941     |           | Plutonium Purification - Small Aliquot, rev 0 |

|                 |       |             |
|-----------------|-------|-------------|
| AVERAGES ± 2 SD | MDA   | 0.15 ± 0.11 |
| FOR 6 SAMPLES   | YIELD | 76 ± 29     |

## METHOD SUMMARIES

Page 2

## SUMMARY DATA SECTION

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|             |          |
|-------------|----------|
| Lab id      | TMANC    |
| Protocol    | Hanford  |
| Version     | Ver 1.0  |
| Form        | DVD-CMS  |
| Version     | 3.06     |
| Report date | 09/16/98 |

## TMA/RICHMOND

SAMPLE DELIVERY GROUP H0198

Test TP Matrix LIQUID

SDG 7492

Contact N. Joseph Verville

## METHOD SUMMARY

AMERICIUM 241/CURIUM IN LIQUID

ALPHA SPECTROSCOPY

Client Hanford

Contract TRB-SBB-207925

Case no SDG H0198

## RESULTS

| CLIENT SAMPLE ID           | LAB<br>SAMPLE ID | RAW<br>TEST FIX | SUF-<br>PLANCHET | Curium 244 | Americium<br>241 |
|----------------------------|------------------|-----------------|------------------|------------|------------------|
| Preparation batch 2785-118 |                  |                 |                  |            |                  |
| BOPPC1                     | N808085-01       |                 | 7492-001         | U          | U                |
| BOPPC2                     | N808085-02       |                 | 7492-002         | U          | U                |
| BOPPC3                     | N808085-03       |                 | 7492-003         | U          | U                |
| BLK (QC ID=28921)          | N808085-05       |                 | 7492-005         | U          | U                |
| LCS (QC ID=28920)          | N808085-04       |                 | 7492-004         | ok         | ok               |
| Duplicate (N808085-01)     | N808085-06       |                 | 7492-006         | ok         | ok               |

Nominal values and limits from method RDLs (pCi/L)  
202-S Bldg-Pu Loadout Hood-Other Liq

## METHOD PERFORMANCE

| CLIENT SAMPLE ID  | LAB<br>SAMPLE ID | RAW<br>TEST FIX | SUF-<br>pCi/L | MAX MDA<br>pCi/L | ALIQ<br>L | PREP<br>FAC | DILU-<br>TION | YIELD<br>% | EFF<br>% | COUNT<br>min | FWHM<br>keV | DRIFT<br>KeV | DAYS<br>HELD | ANAL-<br>PREPARED | YZED   | DETECTOR |
|---|------------------|-----------------|---------------|------------------|-----------|-------------|---------------|------------|----------|--------------|-------------|--------------|--------------|-------------------|--------|----------|
| Preparation batch 2785-118 2σ prep error 5.0 % Reference Lab Notebook #2785 pg. 118 |                  |                 |               |                  |           |             |               |            |          |              |             |              |              |                   |        |          |
| BOPPC1  | N808085-01       |                 | 0.15          | 0.100            |           |             |               | 81         | 1080     |              |             | 23           | 09/02/98     | 09/02             | SS-056 |          |
| BOPPC2  | N808085-02       |                 | 0.11          | 0.100            |           |             |               | 74         | 1080     |              |             | 23           | 09/02/98     | 09/02             | SS-058 |          |
| BOPPC3  | N808085-03       |                 | 0.10          | 0.100            |           |             |               | 82         | 1080     |              |             | 23           | 09/02/98     | 09/02             | SS-059 |          |
| BLK (QC ID=28921)   | N808085-05       |                 | 0.14          | 0.100            |           |             |               | 76         | 1080     |              |             |              | 09/02/98     | 09/02             | SS-065 |          |
| LCS (QC ID=28920)   | N808085-04       |                 | 0.13          | 0.100            |           |             |               | 82         | 1080     |              |             |              | 09/02/98     | 09/02             | SS-062 |          |
| Duplicate (N808085-01)<br>(QC ID=28922)   | N808085-06       |                 | 0.12          | 0.100            |           |             |               | 71         | 1080     |              |             | 23           | 09/02/98     | 09/02             | SS-066 |          |

Nominal values and limits from method 0.100 20-105 700 100

PROCEDURES RP-070 Sample Dissolution - HF Method, rev 0  
RP-941 Plutonium Purification - Small Aliquot, rev 0  
RP-961 Americium-Curium Purification - Small Aliquot,  
rev 0

AVERAGES ± 2 SD MDA 0.12 ± 0.037  
FOR 6 SAMPLES YIELD 78 ± 9

## METHOD SUMMARIES

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## SUMMARY DATA SECTION

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Lab id TMANC

Protocol Hanford

Version Ver 1.0

Form DVD-CMS

Version 3.06

Report date 09/16/98

## TMA/RICHMOND

SAMPLE DELIVERY GROUP H0198

Test SR Matrix LIQUID  
 SDG 7492  
 Contact N. Joseph Verville

## METHOD SUMMARY

TOTAL STRONTIUM IN LIQUID  
 BETA COUNTING

Client Hanford  
 Contract TRB-SBB-207925  
 Case no SDG H0198

## RESULTS

| CLIENT SAMPLE ID | LAB<br>SAMPLE ID | RAW<br>TEST FIX | SUF-<br>PLANCHET | Total<br>Strontium |
|------------------|------------------|-----------------|------------------|--------------------|
|------------------|------------------|-----------------|------------------|--------------------|

Preparation batch 2785-118

|                        |            |  |          |     |
|------------------------|------------|--|----------|-----|
| BOPPC1                 | N808085-01 |  | 7492-001 | U   |
| BOPPC2                 | N808085-02 |  | 7492-002 | U   |
| BOPPC3                 | N808085-03 |  | 7492-003 | U   |
| BLK (QC ID=28921)      | N808085-05 |  | 7492-005 | U   |
| LCS (QC ID=28920)      | N808085-04 |  | 7492-004 | ok  |
| Duplicate (N808085-01) | N808085-06 |  | 7492-006 | - U |

Nominal values and limits from method RDLs (pCi/L) 2.0  
 202-S Bldg-Pu Loadout Hood-Other Liq

## METHOD PERFORMANCE

| CLIENT SAMPLE ID | LAB<br>SAMPLE ID | RAW<br>TEST FIX | SUF-<br>pCi/L | MDA | ALIQ<br>L | PREP<br>FAC | DILU-<br>TION | YIELD<br>% | EFF<br>% | COUNT<br>min | FWHM<br>keV | DRIFT<br>KeV | DAYS<br>HELD | ANAL-<br>PREPARED | YZED | DETECTOR |
|------------------|------------------|-----------------|---------------|-----|-----------|-------------|---------------|------------|----------|--------------|-------------|--------------|--------------|-------------------|------|----------|
|------------------|------------------|-----------------|---------------|-----|-----------|-------------|---------------|------------|----------|--------------|-------------|--------------|--------------|-------------------|------|----------|

Preparation batch 2785-118 2σ prep error 10.0 % Reference Lab Notebook #2785 pg. 118

|   |            |  |            |       |  |  |  |    |     |  |  |    |          |       |         |
|---|------------|--|------------|-------|--|--|--|----|-----|--|--|----|----------|-------|---------|
| BOPPC1                                  | N808085-01 |  | <u>2.2</u> | 0.100 |  |  |  | 81 | 400 |  |  | 17 | 08/27/98 | 08/27 | GRB-227 |
| BOPPC2                                  | N808085-02 |  | <u>2.0</u> | 0.100 |  |  |  | 86 | 400 |  |  | 17 | 08/27/98 | 08/27 | GRB-228 |
| BOPPC3                                  | N808085-03 |  | <u>2.5</u> | 0.100 |  |  |  | 76 | 400 |  |  | 17 | 08/27/98 | 08/27 | GRB-229 |
| BLK (QC ID=28921)                       | N808085-05 |  | <u>2.3</u> | 0.100 |  |  |  | 81 | 400 |  |  |    | 08/27/98 | 08/27 | GRB-231 |
| LCS (QC ID=28920)                       | N808085-04 |  | <u>2.6</u> | 0.100 |  |  |  | 79 | 200 |  |  |    | 08/27/98 | 08/27 | GRB-217 |
| Duplicate (N808085-01)<br>(QC ID=28922) | N808085-06 |  | <u>2.2</u> | 0.100 |  |  |  | 80 | 400 |  |  | 17 | 08/27/98 | 08/27 | GRB-232 |

Nominal values and limits from method 2.0 0.100 100 180

PROCEDURES REFERENCE SR8990  
 RP-500 Strontium - Initial Separation, rev 0  
 RP-519 Strontium-89,90 Demounting and Yttrium  
 Purification, rev 0

AVERAGES ± 2 SD MDA 2.3 ± 0.44  
 FOR 6 SAMPLES YIELD 80 ± 7

## METHOD SUMMARIES

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## SUMMARY DATA SECTION

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Lab id TMANC  
 Protocol Hanford  
 Version Ver 1.0  
 Form DVD-CMS  
 Version 3.06  
 Report date 09/16/98

## TMA/RICHMOND

SAMPLE DELIVERY GROUP H0198

Test 80A Matrix LIQUIDSDG 7492Contact N. Joseph Verville

## METHOD SUMMARY

GROSS ALPHA IN LIQUID SAMPLES

GAS PROPORTIONAL COUNTING

Client HanfordContract TRB-SBB-207925Case no SDG H0198

## RESULTS

| CLIENT SAMPLE ID                      | LAB<br>SAMPLE ID | RAW<br>TEST FIX | SUF-<br>PLANCHET | 1: Gross<br>Alpha | 2: Sum, Alpha<br>Emitters | RESULT RATIO (%)<br>2+1 2σ |
|---------------------------------------|------------------|-----------------|------------------|-------------------|---------------------------|----------------------------|
| Preparation batch 2785-118            |                  |                 |                  |                   |                           |                            |
| BOPPC1                                | N808085-01       | 80              | 7492-001         | U                 |                           |                            |
| BOPPC2                                | N808085-02       | 80              | 7492-002         | U                 |                           |                            |
| BOPPC3                                | N808085-03       | 80              | 7492-003         | U                 |                           |                            |
| BLK (QC ID=28921)                     | N808085-05       | 80              | 7492-005         | U                 |                           |                            |
| LCS (QC ID=28920)                     | N808085-04       | 80              | 7492-004         | ok                |                           |                            |
| Duplicate (N808085-02)                | N808085-07       | 80              | 7492-007         | -                 | U                         |                            |
| Nominal values and limits from method |                  |                 |                  |                   |                           |                            |
| 202-S Bldg-Pu Loadout Hood-Other Liq  |                  |                 | RDLs (pCi/L)     | 3.0               |                           | Average                    |

## METHOD PERFORMANCE

| CLIENT SAMPLE ID   | LAB<br>SAMPLE ID | RAW<br>TEST FIX | SUF-<br>pCi/L | MDA<br>L | ALIQ<br>L | PREP<br>FAC | DILU-<br>TION | RESID<br>mg | EFF<br>% | COUNT<br>min | FWHM<br>keV | DRIFT<br>KeV | DAYS<br>HELD | ANAL-<br>PREPARED | YZED    | DETECTOR |
|--|------------------|-----------------|---------------|----------|-----------|-------------|---------------|-------------|----------|--------------|-------------|--------------|--------------|-------------------|---------|----------|
| Preparation batch 2785-118 2σ prep error 20.0 % Reference Lab Notebook #2785 pg. 118 |                  |                 |               |          |           |             |               |             |          |              |             |              |              |                   |         |          |
| BOPPC1   | N808085-01       | 80              | 1.1           | 0.100    |           |             |               | <u>1</u>    | 396      |              |             | 15           | 08/25/98     | 08/25             | GRB-113 |          |
| BOPPC2   | N808085-02       | 80              | 2.2           | 0.100    |           |             |               | <u>0</u>    | 100      |              |             | 17           | 08/25/98     | 08/27             | GRB-113 |          |
| BOPPC3   | N808085-03       | 80              | 1.3           | 0.100    |           |             |               | <u>1</u>    | 396      |              |             | 15           | 08/25/98     | 08/25             | GRB-115 |          |
| BLK (QC ID=28921)  | N808085-05       | 80              | 2.9           | 0.100    |           |             |               | 31          | 100      |              |             |              | 08/25/98     | 08/26             | GRB-111 |          |
| LCS (QC ID=28920)  | N808085-04       | 80              | 1.5           | 0.100    |           |             |               | 30          | 396      |              |             |              | 08/25/98     | 08/25             | GRB-116 |          |
| Duplicate (N808085-02)<br>(QC ID=28990)  | N808085-07       | 80              | 2.4           | 0.100    |           |             |               | <u>0</u>    | 100      |              |             | 16           | 08/25/98     | 08/26             | GRB-112 |          |
| Nominal values and limits from method  |                  |                 |               |          |           |             |               |             |          |              |             |              |              |                   |         |          |
|  |                  |                 | 3.0           | 0.100    |           |             |               | 5-150       | 100      |              |             | 180          |              |                   |         |          |

PROCEDURES REFERENCE EPA900.0  
EP-120 Gross Alpha and Gross Beta in Environmental Water,  
rev 2

AVERAGES ± 2 SD MDA 1.9 ± 1.4  
FOR 6 SAMPLES RESIDUE 10 ± 31

## METHOD SUMMARIES

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## SUMMARY DATA SECTION

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Lab id TMANCProtocol HanfordVersion Ver 1.0Form DVD-CMSVersion 3.06Report date 09/16/98

## TMA/RICHMOND

SAMPLE DELIVERY GROUP H0198

Test 80B Matrix LIQUIDSDG 7492Contact N. Joseph Verville

## METHOD SUMMARY

GROSS BETA IN LIQUID SAMPLES  
GAS PROPORTIONAL COUNTINGClient HanfordContract TRB-SBB-207925Case no SDG\_H0198

## RESULTS

|                                       | LAB        | RAW  | SUF-         | 1: Gross | 2: Sum, Beta | RESULT RATIO (%) |           |
|---------------------------------------|------------|------|--------------|----------|--------------|------------------|-----------|
| CLIENT SAMPLE ID                      | SAMPLE ID  | TEST | FIX          | PLANCHET | Beta         | Emitters         | 2+1    2σ |
| <hr/>                                 |            |      |              |          |              |                  |           |
| Preparation batch 2785-118            |            |      |              |          |              |                  |           |
| BOPPC1                                | N808085-01 | 80   |              | 7492-001 | U            |                  |           |
| BOPPC2                                | N808085-02 | 80   |              | 7492-002 | U            |                  |           |
| BOPPC3                                | N808085-03 | 80   |              | 7492-003 | U            |                  |           |
| BLK (QC ID=28921)                     | N808085-05 | 80   |              | 7492-005 | U            |                  |           |
| LCS (QC ID=28920)                     | N808085-04 | 80   |              | 7492-004 | ok           |                  |           |
| Duplicate (N808085-02)                | N808085-07 | 80   |              | 7492-007 | -            | U                |           |
| <hr/>                                 |            |      |              |          |              |                  |           |
| Nominal values and limits from method |            |      | RDLs (pCi/L) |          | 4.0          |                  |           |
| 202-S Bldg-Pu Loadout Hood-Other Liq  |            |      |              |          |              | Average          |           |

## METHOD PERFORMANCE

| CLIENT SAMPLE ID   | LAB<br>SAMPLE ID | RAW<br>TEST | SUF-<br>FIX | MDA<br>pCi/L | ALIQ<br>ml | PREP<br>FAC | DILU-<br>TION | RESID<br>mg | EFF<br>% | COUNT<br>min | FWHM<br>keV | DRIFT<br>KeV | DAYS<br>HELD | ANAL-<br>PREPARED | YZED    | DETECTOR |
|--|------------------|-------------|-------------|--------------|------------|-------------|---------------|-------------|----------|--------------|-------------|--------------|--------------|-------------------|---------|----------|
| Preparation batch 2785-118      2σ prep error 15.0 %      Reference Lab Notebook #2785 pg. 118 |                  |             |             |              |            |             |               |             |          |              |             |              |              |                   |         |          |
| BOPPC1   | N808085-01       | 80          |             | 2.8          | 0.100      |             |               | <u>1</u>    | 396      |              |             | 15           | 08/25/98     | 08/25             | GRB-113 |          |
| BOPPC2   | N808085-02       | 80          |             | <u>5.6</u>   | 0.100      |             |               | <u>0</u>    | 100      |              |             | 17           | 08/25/98     | 08/27             | GRB-113 |          |
| BOPPC3   | N808085-03       | 80          |             | 2.8          | 0.100      |             |               | <u>1</u>    | 396      |              |             | 15           | 08/25/98     | 08/25             | GRB-115 |          |
| BLK (QC ID=28921)  | N808085-05       | 80          |             | <u>6.2</u>   | 0.100      |             |               | 31          | 100      |              |             |              | 08/25/98     | 08/26             | GRB-111 |          |
| LCS (QC ID=28920)  | N808085-04       | 80          |             | 3.8          | 0.100      |             |               | 30          | 396      |              |             |              | 08/25/98     | 08/25             | GRB-116 |          |
| Duplicate (N808085-02)   | N808085-07       | 80          |             | <u>6.4</u>   | 0.100      |             |               | <u>0</u>    | 100      |              |             | 16           | 08/25/98     | 08/26             | GRB-112 |          |
| (QC ID=28990)  |                  |             |             |              |            |             |               |             |          |              |             |              |              |                   |         |          |
| Nominal values and limits from method  |                  |             |             |              |            |             |               |             |          |              |             |              |              |                   |         |          |
|  |                  |             |             | 4.0          | 0.100      |             |               | 5-150       | 100      |              |             | 180          |              |                   |         |          |

PROCEDURES    REFERENCE    EPA900.0  
 EP-120      Gross Alpha and Gross Beta in Environmental Water,  
 rev 2

AVERAGES ± 2 SD      MDA 4.6 ± 3.3  
 FOR 6 SAMPLES      RESIDUE 10 ± 31

## METHOD SUMMARIES

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## SUMMARY DATA SECTION

Page 20

Lab id TMANCProtocol HanfordVersion Ver 1.0Form DVD-CMSVersion 3.06Report date 09/16/98

**TMA/RICHMOND**

SAMPLE DELIVERY GROUP H0198

Test GAM Matrix LIQUIDSDG 7492Contact N. Joseph Verville**METHOD SUMMARY**

GAMMA SCAN IN LIQUID

GAMMA SPECTROSCOPY

Client HanfordContract TRB-SBB-207925Case no SDG H0198**RESULTS**

| CLIENT SAMPLE ID           | LAB<br>SAMPLE ID | RAW SUP-<br>TEST FIX | PLANCHET | Cobalt 60 | Cesium 137 |
|----------------------------|------------------|----------------------|----------|-----------|------------|
| Preparation batch 2785-118 |                  |                      |          |           |            |
| BOPPC1                     | N808085-01       |                      | 7492-001 | U         | U          |
| BOPPC2                     | N808085-02       |                      | 7492-002 | U         | U          |
| BOPPC3                     | N808085-03       |                      | 7492-003 | U         | U          |
| BLK (QC ID=28921)          | N808085-05       |                      | 7492-005 | U         | U          |
| LCS (QC ID=28920)          | N808085-04       |                      | 7492-004 | ok        | ok         |
| Duplicate (N808085-01)     | N808085-06       |                      | 7492-006 | - UX      | - UX       |

Nominal values and limits from method RDLs (pCi/L) 25 15  
202-S Bldg-Pu Loadout Hood-Other Liq

**METHOD PERFORMANCE**

| CLIENT SAMPLE ID   | LAB<br>SAMPLE ID | RAW SUP-<br>TEST FIX | MAX MDA<br>pCi/L | ALIQ<br>L | PREP<br>FAC | DILU-<br>TION | YIELD<br>% | EFF<br>% | COUNT<br>min | FWHM<br>keV | DRIFT<br>KeV | DAYS<br>HELD | ANAL-<br>PREPARED | YZED     | DETECTOR |
|--|------------------|----------------------|------------------|-----------|-------------|---------------|------------|----------|--------------|-------------|--------------|--------------|-------------------|----------|----------|
| Preparation batch 2785-118 2σ prep error 10.0 % Reference Lab Notebook #2785 pg. 118 |                  |                      |                  |           |             |               |            |          |              |             |              |              |                   |          |          |
| BOPPC1   | N808085-01       |                      | <u>16</u>        | 0.500     |             |               |            |          | 408          |             | 16           | 08/26/98     | 08/26             | 01,01,00 |          |
| BOPPC2   | N808085-02       |                      | <u>16</u>        | 0.500     |             |               |            |          | 408          |             | 16           | 08/26/98     | 08/26             | 01,03,00 |          |
| BOPPC3   | N808085-03       |                      | 6.0              | 0.500     |             |               |            |          | 408          |             | 16           | 08/26/98     | 08/26             | 01,04,00 |          |
| BLK (QC ID=28921)  | N808085-05       |                      | 13               | 0.500     |             |               |            |          | 485          |             |              | 08/26/98     | 08/27             | 01,03,00 |          |
| LCS (QC ID=28920)  | N808085-04       |                      | <u>29</u>        | 0.500     |             |               |            |          | 420          |             |              | 08/26/98     | 08/27             | 01,01,00 |          |
| Duplicate (N808085-01)<br>(QC ID=28922)  | N808085-06       |                      | 5.5              | 0.500     |             |               |            |          | 485          |             | 17           | 08/26/98     | 08/27             | 01,04,00 |          |

Nominal values and limits from method 15 0.500 5 180

| PROCEDURES | REFERENCE | GAMMAHI  |
|------------|-----------|--|
|            | RP-070    | Sample Dissolution - HF Method, rev 0                  |
|            | RP-100    | Ge(Li) Preparation for Reactor Waste Samples,<br>rev 0 |

AVERAGES ± 2 SD

FOR 6 SAMPLES

MDA 14 ± 17

YIELD \_\_\_\_\_ ± \_\_\_\_\_

**METHOD SUMMARIES**

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**SUMMARY DATA SECTION**

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Lab id TMANCProtocol HanfordVersion Ver 1.0Form DVD-CMSVersion 3.06Report date 09/16/98

**TMA / RICHMOND**  
**SAMPLE DELIVERY GROUP H0198**

SDG 7492  
Contact N. Joseph Verville

**REPORT GUIDE**

Client Hanford  
Contract TRB-SBB-207925  
Case no SDG H0198

**SAMPLE SUMMARY**

The Sample and QC Summary Reports show all samples, including QC samples, reported in one Sample Delivery Group (SDG).

The Sample Summary Report fully identifies client samples and gives the corresponding lab sample identification. The QC Summary Report shows at the sample level how the lab organized the samples into batches and generated QC samples. The Preparation Batch and Method Summary Reports show this at the analysis level.

The following notes apply to these reports:

- \* LAB SAMPLE ID is the lab's primary identification for a sample.
- \* DEPARTMENT SAMPLE ID is an alternate lab id, for example one assigned by a radiochemistry department in a lab.
- \* CLIENT SAMPLE ID is the client's primary identification for a sample. It includes any sample preparation done by the client that is necessary to identify the sample.
- \* QC BATCH is a lab assigned code that groups samples to be processed and QCed together. These samples should have similar matrices.

QC BATCH is not necessarily the same as SDG, which reflects samples received and reported together.

- \* All Lab Control Samples, Method Blanks, Duplicates and Matrix Spikes are shown that QC any of the samples. Due to possible reanalyses, not all results for all these QC samples may be relevant to the SDG. The Lab Control Sample, Method Blank, Duplicate, Matrix Spike and Method Summary Reports detail these relationships.

**REPORT GUIDES**

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**SUMMARY DATA SECTION**

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Lab id TMANC  
Protocol Hanford  
Version Ver 1.0  
Form DVD-RG  
Version 3.06  
Report date 09/16/98

**TMA/RICHMOND**  
**SAMPLE DELIVERY GROUP H0198**

SDG 7492  
Contact N. Joseph Verville

**REPORT GUIDE**

Client Hanford  
Contract TRB-SBB-207925  
Case no SDG H0198

**PREPARATION BATCH SUMMARY**

The Preparation Batch Summary Report shows all preparation batches in one Sample Delivery Group (SDG) with information necessary to check the completeness and consistency of the SDG.

The following notes apply to this report:

- \* The preparation batches are shown in the same order as the Method Summary Reports are printed.
- \* Only analyses of planchets relevant to the SDG are included.
- \* Each preparation batch should have at least one Method Blank and LCS in it to validate client sample results.
- \* The QUALIFIERS shown are all qualifiers other than U, J, B, L and H that occur on any analysis in the preparation batch. The Method Summary Report has these qualifiers on a per sample basis.

These qualifiers should be reviewed as follows:

- X Some data has been manually entered or modified.  
Transcription errors are possible.
- P One or more results are 'preliminary!'. The data is not ready for final reporting.
- 2 There were two or more results for one analyte on one planchet imported at one time. The results in DVD may not be the same as on the raw data sheets.

Other lab defined qualifiers may occur. In general, these should be addressed in the SDG narrative.

**REPORT GUIDES**

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**SUMMARY DATA SECTION**

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Lab id TMANC  
Protocol Hanford  
Version Ver 1.0  
Form DVD-RG  
Version 3.06  
Report date 09/16/98

**TMA / RICHMOND**  
**SAMPLE DELIVERY GROUP H0198**

SDG 7492  
Contact N. Joseph Verville

**REPORT GUIDE**

Client Hanford  
Contract TRB-SBB-207925  
Case no SDG H0198

**WORK SUMMARY**

The Work Summary Report shows all samples, including QC samples, and all relevant analyses in one Sample Delivery Group (SDG). This report is often useful as supporting documentation for an invoice.

The following notes apply to this report:

- \* TEST is a code for the method used to measure associated analytes. Results and related information for each analyte are on the Data Sheet Report. In special cases, a test code used in the summary data section is not the same as in associated raw data. In this case, both codes are shown on the Work Summary.
- \* SUFFIX is the lab's code to distinguish multiple analyses (recounts, reworks, reanalyses) of a fraction of the sample. The suffix indicates which result is being reported. An empty suffix normally identifies the first attempt to analyze the sample.
- \* The LAB SAMPLE ID, TEST and SUFFIX uniquely identify all supporting data for a result. The Method Summary Report for each TEST has method performance data, such as yield, for each lab sample id and suffix and procedures used in the method.
- \* PLANCHET is an alternate lab identifier for work done for one test. It, combined with the TEST and SUFFIX, may be the best link to raw data.
- \* For QC samples, only analyses that directly QC some regular sample are shown. The Lab Control Sample, Method Blank, Duplicate, Matrix Spike and Method Summary Reports detail these relationships.
- \* The SAS (Special Analytical Services) Number is a client or lab assigned code that reflects special processing for samples, such as rapid turn around. Counts of tests done are lists by SAS number since it is likely to affect prices.

**REPORT GUIDES**

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**SUMMARY DATA SECTION**

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Lab id TMANC  
Protocol Hanford  
Version Ver 1.0  
Form DVD-RG  
Version 3.06  
Report date 09/16/98

**TMA / RICHMOND**  
**SAMPLE DELIVERY GROUP H0198**

SDG 7492  
Contact N. Joseph Verville

**REPORT GUIDE**

Client Hanford  
Contract TRB-SBB-207925  
Case no SDG H0198

**DATA SHEET**

The Data Sheet Report shows all results and primary supporting information for one client sample or Method Blank. This report corresponds to both the CLP Inorganics and Organics Data Sheet.

The following notes apply to this report:

- \* TEST is a code for the method used to measure an analyte. If the TEST is empty, no data is available; the analyte was not analyzed for.
- \* The LAB SAMPLE ID and TEST uniquely identify work within the Summary Data Section of a Data Package. The Work Summary and Method Summary Reports further identify raw data that underlies this work.

The Method Summary Report for each TEST has method performance data, such as yield, for each Lab Sample ID and a list of procedures used in the method.

- \* ERRORS can be labeled TOTAL or COUNT. TOTAL implies a preparation (non-counting method) error has been added, as square root of sum of squares, to the counting error denoted by COUNT. The preparation errors, which may vary by preparation batch, are shown on the Method Summary Report.
- \* A RESULT can be 'N.R.' (Not Reported). This means the lab did this work but chooses not to report it now, possibly because it was reported at another time.
- \* When reporting a Method Blank, a RESULT can be 'N.A.' (Not Applicable). This means there is no reported client sample work in the same preparation batch as the Blank's result. This is likely to occur when the Method Blank is associated with reanalyses of selected work for a few samples in the SDG.

The following qualifiers are defined by the DVD system:

- U The RESULT is less than the MDA (Minimum Detectable Activity).

**REPORT GUIDES**

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**SUMMARY DATA SECTION**

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Lab id TMANC  
Protocol Hanford  
Version Ver 1.0  
Form DVD-RG  
Version 3.06  
Report date 09/16/98

**TMA/RICHMOND**  
**SAMPLE DELIVERY GROUP H0198**

SDG 7492  
Contact N. Joseph Verville

**GUIDE, cont.**

Client Hanford  
Contract TRB-SBB-207925  
Case no SDG H0198

**DATA SHEET**

If the MDA is blank, the ERROR is used as the limit.

- J The RESULT is less than the RDL (Required Detection Limit) and no U qualifier is assigned.
- B A Method Blank associated with this sample had a result without a U flag and, after correcting for possibly different aliquots, that result is greater than or equal to the MDA for this sample.

Normally, B is not assigned if U is. When method blank subtraction is shown on this report, B flags are assigned based on the unsubtracted values while U's are assigned based on the subtracted ones. Both flags can be assigned in this case.

For each sample result, all Method Blank results in the same preparation batch are compared. The Method Summary Report documents this and other QC relationships.

- L Some Lab Control Sample that QC's this sample had a low recovery. The lab can disable assignment of this qualifier.
- H Similar to 'L' except the recovery was high.
- P The RESULT is 'preliminary'.
- X Some data necessary to compute the RESULT, ERROR or MDA was manually entered or modified.
- 2 There were two or more results available for this analyte. The reported result may not be the same as in the raw data.

Other qualifiers are lab defined. Definitions should be in the SDG narrative.

The following values are underlined to indicate possible problems:

- \* An MDA is underlined if it is bigger than its RDL.

**REPORT GUIDES**

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**SUMMARY DATA SECTION**

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**GUIDE, cont.**

Client Hanford  
Contract TRB-SBB-207925  
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**DATA SHEET**

- \* An ERROR is underlined if the 1.645 sigma counting error is bigger than both the MDA and the RESULT, implying that the MDA may not be a good estimate of the 'real' minimum detectable activity.
- \* A negative RESULT is underlined if it is less than the negative of its 2 sigma counting ERROR.
- \* When reporting a Method Blank, a RESULT is underlined if greater than its MDA. If the MDA is blank, the 2 sigma counting error is used in the comparison.

**REPORT GUIDES**

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**SUMMARY DATA SECTION**

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**REPORT GUIDE**

Client Hanford  
Contract TRB-SBB-207925  
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**LAB CONTROL SAMPLE**

The Lab Control Sample Report shows all results, recoveries and primary supporting information for one Lab Control Sample.

The following notes apply to this report:

- \* All fields in common with the Data Sheet Report have similar usage. Refer to its Report Guide for details.
- \* An amount ADDED is the lab's value for the actual amount spiked into this sample with its ERROR an estimate of the error of this amount.

An amount added is underlined if its ratio to the corresponding RDL is outside protocol specified limits.

- \* REC (Recovery) is RESULT divided by ADDED expressed as a percent.
- \* The first, computed limits for the recovery reflect:
  1. The error of RESULT, including that introduced by rounding the result prior to printing.

If the limits are labeled (TOTAL), they include preparation error in the result. If labeled (COUNT), they do not.
  2. The error of ADDED.
  3. A lab specified, per analyte bias. The bias changes the center of the computed limits.
- \* The second limits are protocol defined upper and lower QC limits for the recovery.
- \* The recovery is underlined if it is outside either of these ranges.

**REPORT GUIDES**

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**SUMMARY DATA SECTION**

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**REPORT GUIDE**

Client Hanford  
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**DUPLICATE**

The Duplicate Report shows all results, differences and primary supporting information for one Duplicate and associated Original sample.

The following notes apply to this report:

- \* All fields in common with the Data Sheet Report have similar usage. This applies both to the Duplicate and Original sample data. Refer to the Data Sheet Report Guide for details.

If the Duplicate has data for a TEST and the lab did not do this test to the Original, the Original's RESULTS are underlined.

- \* The RPD (Relative Percent Difference) is the absolute value of the difference of the RESULTS divided by their average expressed as a percent.

If both RESULTS are less than their MDAs, no RPD is computed and a '-' is printed.

For an analyte, if the lab did work for both samples but has data for only one, the MDA from the sample with data is used as the other's result in the RPD.

- \* The first, computed limit is the sum, as square root of sum of squares, of the errors of the results divided by the average result as a percent, hence the relative error of the difference rather than the error of the relative difference. The errors include those introduced by rounding the RESULTS prior to printing.

If this limit is labeled TOT, it includes the preparation error in the RESULTS. If labeled CNT, it does not.

This value reported for this limit is at most 999.

- \* The second limit for the RPD is the larger of:
  1. A fixed percentage specified in the protocol.

**REPORT GUIDES**

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**TMA / RICHMOND**  
**SAMPLE DELIVERY GROUP H0198**

SDG 7492  
Contact N. Joseph Verville

**GUIDE, cont.**

Client Hanford  
Contract TRB-SBB-207925  
Case no SDG H0198

**DUPLICATE**

2. A protocol factor (typically 2) times the average MDA as a percent of the average result. This limit applies when the results are close to the MDAs.

- \* The RPD is underlined if it is greater than either limit.
- \* If specified by the lab, the second limit column is replaced by the Difference Error Ratio (DER), which is the absolute value of the difference of the results divided by the quadratic sum of their one sigma errors, the same errors as used in the first limit.

Except for differences due to rounding, the DER is the same as the RPD divided by the first RPD limit with the limit scaled to 1 sigma.

- \* The DER is underlined if it is greater than the sigma factor, typically 2 or 3, shown in the header for the first RPD limit.

**REPORT GUIDES**

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**TMA / RICHMOND**  
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SDG 7492  
Contact N. Joseph Verville

**REPORT GUIDE**

Client Hanford  
Contract TRB-SBB-207925  
Case no SDG\_H0198

**MATRIX SPIKE**

The Matrix Spike Report shows all results, recoveries and primary supporting information for one Matrix Spike and associated Original sample.

The following notes apply to this report:

- \* All fields in common with the Data Sheet Report have similar usage. This applies both to the Spiked and Original sample data. Refer to the Data Sheet Report Guide for details.

If the Spike has data for a TEST and the lab did not do this test to the Original, the Original's RESULTS are underlined.

- \* An amount ADDED is the lab's value for the actual amount spiked into the Spike sample with its ERROR an estimate of the error of this amount.

An amount is underlined if its ratio to the corresponding RDL is outside protocol specified limits.

- \* REC (Recovery) is the Spike RESULT minus the Original RESULT divided by ADDED expressed as a percent.

- \* The first, computed limits for the recovery reflect:

1. The errors of the two RESULTS, including those introduced by rounding them prior to printing.

If the limits are labeled (TOTAL), they include preparation error in the result. If labeled (COUNT), they do not.

2. The error of ADDED.

3. A lab specified, per analyte bias. The bias changes the center of the computed limits.

- \* The second limits are protocol defined upper and lower QC limits

**REPORT GUIDES**

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**SUMMARY DATA SECTION**

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**TMA / RICHMOND**  
**SAMPLE DELIVERY GROUP H0198**

SDG 7492  
Contact N. Joseph Verville

**GUIDE, cont.**

Client Hanford  
Contract TRE-SBB-207925  
Case no SDG H0198

**MATRIX SPIKE**

for the recovery.

These limits are left blank if the Original RESULT is more than a protocol defined factor (typically 4) times ADDED. This is a way of accounting for that when the spike is small compared to the amount in the original sample, the recovery is unreliable.

- \* The recovery is underlined (out of spec) if it is outside either of these ranges.

**REPORT GUIDES**

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SDG 7492  
Contact N. Joseph Verville

**REPORT GUIDE**

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**METHOD SUMMARY**

The Method Summary Report has two tables. One shows up to five results measured using one method. The other has performance data for the method. There is one report for each TEST, as used on the Data Sheet Report.

The following notes apply to this report:

- \* Each table is subdivided into sections, one for each preparation batch. A preparation batch is a group of aliquots prepared at roughly the same time in one work area of the lab using the same method.

There should be Lab Control Sample and Method Blank results in each preparation batch since this close correspondence makes the QC meaningful. Depending on lab policy, Duplicates need not occur in each batch since they QC sample dependencies such as matrix effects.

- \* The RAW TEST column shows the test code used in the raw data to identify a particular analysis if it is different than the test code in the header of the report. This occurs in special cases due to method specific details about how the lab labels work.

The Lab Sample or Planchet ID combined with the (Raw) Test Code and Suffix uniquely identify the raw data for each analysis.

- \* If a result is less than both its MDA and RDL, it is replaced by just 'U' on this report. If it is greater than or equal to the RDL but less than the MDA, the result is shown with a 'U' flag.

The J and X flags are as on the data sheet.

- \* Non-U results for Method Blanks are underlined to indicate possible contamination of other samples in the preparation batch. The Method Blank Report has supporting data.
- \* Lab Control Sample and Matrix Spike results are shown as: ok, No data, LOW or HIGH, with the last two underlined. 'No data'

**REPORT GUIDES**

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**SUMMARY DATA SECTION**

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**TMA / RICHMOND**  
**SAMPLE DELIVERY GROUP H0198**

SDG 7492  
Contact N. Joseph Verville

**GUIDE, cont.**

Client Hanford  
Contract TRB-SBB-207925  
Case no SDG H0198

**METHOD SUMMARY**

means no amount ADDED was specified. 'LOW' and 'HIGH' correspond to when the recovery is underlined on the Lab Control Sample or Matrix Spike Report. See these reports for supporting data.

- \* Duplicate sample results are shown as: ok, No data, or OUT, with the last two underlined. 'No data' means there was no original sample data found for this duplicate. 'OUT' corresponds to when the RPD is underlined on the Duplicate Report. See this report for supporting data.
- \* If the MDA column is labeled 'MAX MDA', there was more than one result measured by the reported method and the MDA shown is the largest MDA. If not all these results have the same RDL, the MAX MDA reflects only those results with RDL equal to the smallest one.

MDAs are underlined if greater than the printed RDL.

- \* Aliquots are underlined if less than the nominal value specified for the method.
- \* Preparation factors are underlined if greater than the nominal value specified for the method.
- \* Dilution factors are underlined if greater than the nominal value specified for the method.
- \* Residues are underlined if outside the range specified for the method. Residues are not printed if yields are.
- \* Yields, which may be gravimetric, radiometric or some type of recovery depending on the method, are underlined if outside the range specified for the method.
- \* Efficiencies are underlined if outside the range specified for the method. Efficiencies are detector and geometry dependent so this test is only approximate.

**REPORT GUIDES**

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**SUMMARY DATA SECTION**

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**TMA/RICHMOND**  
**SAMPLE DELIVERY GROUP H0198**

SDG 7492  
Contact N. Joseph Verville

**GUIDE, cont.**

Client Hanford  
Contract TRB-SBB-207925  
Case no SDG H0198

**METHOD SUMMARY**

- \* Count times are underlined if less than the nominal value specified for the method.
- \* Resolutions (as FWHM; Full Width at Half Max) are underlined if greater than the method specified limit.
- \* Tracer drifts are underlined if their absolute values are greater than the method specified limit. Tracer drifts are not printed if percent moistures are.
- \* Days Held are underlined if greater than the holding time specified in the protocol.
- \* Analysis dates are underlined if before their planchet's preparation date or, if a limit is specified, too far after it.

For some methods, ratios as percentages and error estimates for them are computed for pairs of results. A ratio column header like '1+3' means the ratio of the first result column and the third result column.

Ratios are not computed for Lab Control Sample, Method Blank or Matrix Spike results since their matrices are not necessarily similar to client samples'.

The error estimate for a ratio of results from one planchet reflects only counting errors since other errors should be correlated. For a ratio involving different planchets, if QC limits are computed based on total errors, the error for the ratio allows for the preparation errors for the planchets.

The ratio is underlined (out of spec) if the absolute value of its difference from the nominal value is greater than its error estimate. If no nominal value is specified, this test is not done.

For Gross Alpha or Gross Beta results, there may be a column showing the sum of other Alpha or Beta emitters. This sum includes all relevant

**REPORT GUIDES**

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**SUMMARY DATA SECTION**

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**GUIDE, cont.**

Client Hanford  
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**METHOD SUMMARY**

results in the DVD database, whether reported or not. Results in the sum are weighted by a particles/decay value specified by the lab for each relevant analyte. Results less than their MDA are not included. No sums are computed for Lab Control, Method Blank or Matrix Spike samples since their various planchets may not be physically related.

If a ratio of total isotopic to Gross Alpha or Beta is shown, the error for the ratio reflects both the error in the Gross result and the sum, as square root of sum of squares, of the errors in the isotopic results.

For total elemental uranium or thorium results, there may be a column showing the total weight computed from associated isotopic results. Ignoring results less than their MDAs, this is a weighted sum of the isotopic results. The weights depend on the molecular weight and half-life of each isotope so as to convert activities (decays) to weight (atoms).

If a ratio of total computed to measured elemental uranium or thorium is shown, the error for the ratio reflects the errors in all the measurements.

**REPORT GUIDES**

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|   |  |   |  |                                    |  |                                  |            |  |             |  |
|---|--|---|--|------------------------------------|--|----------------------------------|------------|--|-------------|--|
| Bechtel Hanford Inc.  |  | <b>CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST</b> |  |                                    |  |                                  | B98-060-09 |  | Page 1 of 1 |  |
| Collector<br>Doug Bryant  |  | Company Contact<br>Michael Galgoul              |  | Telephone No.<br>373-5681          |  | Project Coordinator<br>WEISS, RL |            | Data Turnaround<br><br><div style="font-size: 2em; font-weight: bold;">45 Days</div> |             |  |
| Project Designation<br>202-S Building - Plutonium Loadout Hood - Other Liquid       |  | Sampling Location<br>200 West                   |  | SAF No.<br>B98-060                 |  |                                  |            |  |             |  |
| Ice Chest No.   |  | Field Logbook No.<br>EL-1429                    |  | Method of Shipment<br>Hand deliver |  |                                  |            |  |             |  |
| Shipped To<br>TMA/REGRA Thermo Nutech<br>RF   |  | Offsite Property No.                            |  | Bill of Lading/Air Bill No.        |  |                                  |            |  |             |  |
| Waste Designation<br>Client determined no waste codes associated with this project. |  |   |  | COA                                |  |                                  |            |  |             |  |

| POSSIBLE SAMPLE HAZARDS/REMARKS | Preservation        | HNO <sub>3</sub><br><del>None</del><br>RF | HNO <sub>3</sub><br><del>None</del><br>RF | HNO <sub>3</sub> | Cool 4C | Cool 4C | HNO <sub>3</sub><br><del>None</del><br>RF | None  | Cool 4C | HNO <sub>3</sub><br><del>None</del><br>RF |
|---------------------------------|---------------------|---|---|------------------|---------|---------|---|-------|---------|---|
|                                 | Type of Container   | aG  | aG  | aG               | aG      | aG      | aG  | aG    | aGs*    | aG  |
|                                 | No. of Container(s) | 1   | 1   | 1                | 1       | 1       | 1   | 1     | 3       | 3   |
|                                 | Volume              | 20mL                                      | 20mL                                      | 125mL            | 250mL   | 250mL   | 250mL                                     | 250mL | 40mL    | 500mL                                     |

SDG H 0193

Special Handling and/or Storage  
Cool 4C

N 8-08-0845 085

| SAMPLE ANALYSIS |              |             |             | See item (1) in Special Instructions. | Gross Alpha; Gross Beta | Mercury - 7471 - (CV) | IC Anions - 300.0; IC Anions - 300.0 Add On | PCBs - 8080 | ICP Metals - 6010A (SW-846); ICP Metals - 6010A (Add-on) (Lead) | pH (Water) - 9040 | VOA - 8260A (TCL) | See item (2) in Special Instructions |
|-----------------|--------------|-------------|-------------|---------------------------------------|-------------------------|-----------------------|---|-------------|---|-------------------|-------------------|--------------------------------------|
| Sample No.      | Matrix *     | Sample Date | Sample Time |                                       |                         |                       |   |             |   |                   |                   |                                      |
| BOPPC1          | Other Liquid | 8-10-98     | 1500        | X                                     | X                       |                       |   |             |   |                   |                   | X                                    |
| BOPPC2          | Other Liquid | 8-10-98     | 1505        | X                                     | X                       |                       |   |             |   |                   |                   | X                                    |
| BOPPC3          | Other Liquid | 8-10-98     | 1520        | X                                     | X                       |                       |   |             |   |                   |                   | X                                    |
|                 |              |             |             |                                       |                         |                       |   |             |   |                   |                   |                                      |
|                 |              |             |             |                                       |                         |                       |   |             |   |                   |                   |                                      |

| CHAIN OF POSSESSION | Sign/Print Names |             | SPECIAL INSTRUCTIONS  |
|---------------------|------------------|-------------|---|
| Relinquished By     | Date/Time        | Received By | <p>The laboratory will hold samples until notified by EPC Sample and Data Management to begin analysis, unless holding times are in jeopardy. RF 8-14-98</p> <p>(1) Americium-241/Curium-244; Neptunium-237; Strontium-89,90 - Sr-90; Isotopic Plutonium</p> <p>(2) Gamma Spectroscopy (Cesium-137, Cobalt-60, Europium-152, Europium-154, Europium-155); Gamma Spec - Add-on (Americium-241, Antimony-125, Cesium-134, Radium-226, Radium-228)</p> |
| Relinquished By     | Date/Time        | Received By |   |
| Relinquished By     | Date/Time        | Received By |   |
| Relinquished By     | Date/Time        | Received By |   |

Relinquished By: RF 8-14-98 Date/Time: 1300

Received By: C. SANGALAG 8/18/98/0800

| LABORATORY SECTION       | Received By     | Title       |
|--------------------------|-----------------|-------------|
| FINAL SAMPLE DISPOSITION | Disposal Method | Disposed By |

Matrix \*

- S - Soil
- SE - Sediment
- SO - Solid
- SL - Sludge
- W - Water
- O - Oil
- A - Air
- DS - Drum Solids
- DL - Drum Liquids
- T - Tissue
- WI - Wipe
- L - Liquid
- V - Vegetation
- X - Other

Figure 1

## SAMPLE CHECK-IN LIST

Date/Time Received: 8/17/98 / 0800 S.G.#: H0197  
H0198  
 Work Order Number: 18-08-084-085 SAF #: \_\_\_\_\_  
 Shipping Container ID: SML-354 Chain of Custody #: B9B-060-09, B9B-104-02

1. Custody Seals on shipping container intact? Yes ☒ No ☐
2. Custody Seals dated and signed? Yes ☒ No ☐
3. Chain-of-Custody record present? Yes ☒ No ☐
4. Cooler temperature \_\_\_\_\_
5. Vermiculite/packing materials is Wet ☐ Dry ☒
6. Number of samples in shipping container: 4 (8 - poly bottles)  
1 (9 Glass Jar)  
6 (Glass vials) Yes ☐ No ☐
7. Sample holding times exceeded? Yes ☐ No ☐

8. Samples have:  
☒ tape ☐ hazard labels  
☒ custody seals ☒ appropriate sample labels

9. Samples are:  
☒ in good condition ☐ leaking  
☐ broken ☐ have air bubbles

10. Where any anomalies identified in sample receipt? Yes ☐ No ☒

11. Description of anomalies (include sample numbers): \_\_\_\_\_

Sample Custodian/Laboratory: Reddy/TNA Date: 8/17/98

Telephoned To: \_\_\_\_\_ On \_\_\_\_\_ By \_\_\_\_\_

|                             |                              |   |
|-----------------------------|------------------------------|---|
| Contractor<br>BHI - Hanford | OFF-SITE<br>PROPERTY CONTROL | CONTROL NUMBER<br>(To be obtained from PROPERTY MANAGEMENT)<br>A980038 / W98.0-1288 |
|-----------------------------|------------------------------|---|

PART I - TO BE COMPLETED BY ORIGINATOR

|  |   |   |                            |               |                |
|--|---|---|----------------------------|---------------|----------------|
| Department   | ERC Engineering Support   | Section   | Field & Analytical Support | Unit          | Field Sampling |
| The following items are to be shipped from   |   | <input checked="" type="checkbox"/> Contractor <input type="checkbox"/> Vendor      |                            |               |                |
| Routing  |   | Federal Express <input type="checkbox"/> Contractor <input type="checkbox"/> Vendor |                            |               |                |
| Shipped to   |   | Off-site Custodian  |                            |               |                |
| Thermo NUTech Richmond Laboratory<br>2030 Wright Ave<br>Richmond, CA 94804-0040<br>(510) 235-2633<br>Attn: Larry Johnson |   |   |                            |               |                |
|  |   | Full Title  |                            |               |                |
| Quantity   | Description (Include Serial and any Government Tag Numbers)   |   |                            | Original Cost |                |
| 1  | Sample #: BOPPC1, BOPPC2, BOPPC3, BOPM67<br>Cooler ID: SML-354<br>Gross Weight: 58 lbs<br>Polycooler containing environmental samples packed with vermiculite |   |                            | N/A           |                |

☐ Classified   
 ☒ Unclassified   
☐ Shipped Under DOE Contract   
☐ Shipped Under Contractor's Use Permit Contract

Necessity for the Off-Site Use of this Property

Support project work

Cooler #: SML-354 (584 lbs) Bill of Lading

~~423579515863~~ RJN 8/14/98  
~~423579515896~~ RJN 8/14/98  
 423579515922

CERTIFICATION OF THE RADIATION MONITORING RELEASE MUST BE SECURED THE SAME DAY THAT MATERIAL IS DELIVERED TO SHIPPING.

|  |                         |   |         |                |
|--|-------------------------|---|---------|----------------|
| RM Clearance for Public Release        |                         | RM Survey No.                                   |         | Date           |
| N/A                                    |                         |   |         |                |
| Location of Property (Area & Bldg.)    |                         | Contact   |         | Phone          |
| 100 Area/ 3728 Bldg.                   |                         | Robert Fahlberg                                 |         | (509) 376-8101 |
| Date Ready for Shipment                | Cost Code to be Charged | Approximate Date This Property will be Returned |         |                |
| 8/14/98                                | BRIS2C6A0C              |   |         |                |
| Originated By                          | Date                    | Authorized By                                   | Date    |                |
| Robert Fahlberg                        | 8/14/98                 | <i>Robert Fahlberg</i>                          | 8/14/98 |                |
| Signature and Name of Property Control | Custodian Date          | Property Management Approval                    | Date    |                |
|  |                         | <i>Robert Fahlberg</i>                          | 8/14/98 |                |

PART II - TO BE COMPLETED BY SHIPPING

|                        |                  |             |                    |             |
|------------------------|------------------|-------------|--------------------|-------------|
| Signature of Recipient | Return Order No. | Date Issued | Purchase Order No. | Date Issued |
| <i>Robert Fahlberg</i> |                  |             |                    |             |
| Date                   |                  |             |                    |             |
| 8-14-98                |                  |             |                    |             |

DISTRIBUTION

|  |  |
|--|--|
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